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Electronic components المكونات الإلكترونية

جميع الدوائر الإلكترونية تتكون من مكونات إلكترونية وهذه المكونات الإلكترونية إما أن تكون مكونات

١-Passive Component غير فعالة

وهى المكونات التي يمكن قياس تأثيرها في الدائرة بقيمة واحدة وهى المقاومة و المكثف و الملف وتقاس بالأوم و الفاراد والهنرى بالترتيب وهى مكونات يمكن أن نعرف تأثيرها في الدائرة عن طريق علاقة ثابتة لا تتغير والمكونات الغير فعالة لا تعطى تكبير للفولت ولا للتيار ولذلك سميت غير فعالة

٢- Active Component مكونات فعالة

المكونات الفعالة هي مكونات تعطي تكبير للفولت أو للتيار ولا يكون لها معادلات ثابتة لمعرفة تأثيرها في الدائرة وهى مثل الترانزيستور و الثنائيات و الدوائر المتكاملة و الصمامات

Resistors المقاومات

المقاومة عبارة عن مكون إلكتروني مصمم خصيصا لإعطاء قيمه مقاومة مرغوبة بالدائرة التي توصل بها وتستخدم المقاومات في الدوائر الإلكترونية أما للتحكم في قيمة التيار المار في الدائرة أو لتجزئة الجهد الكهربي و يمكن تعريف المقاومة على أنها الفولت بين طرفي موصل يمر به تيار قيمته واحد أمبير حيث أن

R = V \ I   المقاومة = الجهد / التيار

I begin the tutorials by assuming that you have basic knowledge about electricity like current ,voltage, charges etc.

A resistor is an electronic device that offers obstruction to the flow of electric current.

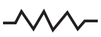
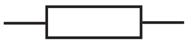
It can be defined as voltage per unit current through a conductor.

Resistance(R)= Voltage (V) / Current (I)

i.e. R=V/I

The unit of resistance is ohm denoted by.   وحدة قياس المقاومة هي الاوم

The circuit symbol of a resistor is: ويعبر عن المقاومة في الدوائر بأحد الرمزين

 or 

In reality, a resistor looks somewhat like this: والمقاومة تبدو فى الحقيقة كما بالشكل التالي ولا يوجد للمقاومة طرف سالب والآخر موجب أي ليس لها قطبية مثل البطاريات

It has no polarity (i.e. + and -) like a battery and can be connected either way in a circuit.

When you ask for a resistor at a store you need to specify 3 things:

و عند طلب المقاومات لابد لنا أن نعرف ثلاثة أشياء

1. **Resistance** قيمة المقاومة
2. **Power handling capacity (wattage)** القدرة التي تتحملها
3. **Tolerance** السماحية

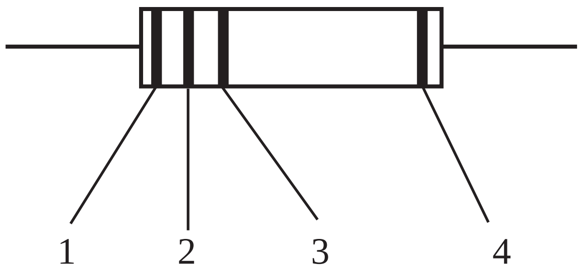
The *resistance* is the value of the resistor in ohm . It can also be in kilo ohm (k) or mega ohm (M).
Here 1k = 1000 الكيلو اوم =١٠٠٠ اوم
And 1 M = 1000k الميجا اوم =١٠٠٠ كيلو اوم
The power handling capacity of a resistor determines the amount of current that can be passed safely through it. It is specified in watt (W). The normal resistors that we use will have a ¼ W capacity. This means that if the resistance is 1kΩ
قدرة **and ¼ W, then the max. Current that can be passed through it is given by:**
المقاومة هي التي تحدد أقصى قيمة للتيار الذي يمر خلالها

$I = \sqrt{W/R}$ وذلك باستخدام القانون المقابل

Where I is max. Current, W is the wattage rating, R is the resistance. For the 1kΩ and ¼ watt resistor,
W= ¼ = 0.25 w
R = 1kΩ
Hence I = 16mA (mA = milliamp = 0.001 amp) . This is the max. Current that can flow through this resistor.
The resistors are available in 1/8 W, ¼ W, ½ W , 1W , 2W and so on.
As the wattage increases the resistor's cost tend to increase and they also get bulkier. كلما زدت قدرة المقاومة كلما ارتفع ثمنها و زاد حجمها
***Tolerance* is the extent to which the resistor value sways from the original value. You may think as to why the resistance value should change from the printed value? Well, we live in a world that is far from perfect and resistors are no exceptions. Their value changes mainly due to the change in temperature.**
The tolerance values of commercially available resistors are usually ±5%, ±10% and ±20%, where the value indicates the % drift from the original value.
e.g. , if the resistor value if 1kΩ and has a ±10% tolerance, it means that the actual value of the resistor may be between 1kΩ ±10% i.e 1kΩ + 100Ω or 1kΩ - 100Ω i.e. 1.1kΩ to 0.9kΩ

How to identify the resistance value from color bands: كيفية حساب قيمة المقاومة

Hold the resistor as shown below: ضع المقاومة كما بالشكل التالي



Three bands that are close together are to the left. حيث تكون الثلاثة ألوان القريبة من بعضها إلى الشمال

Then colors of:

Band no.1 signifies the 1st digit اللون الأول يحدد أول رقم
Band no.2 signifies the 2nd digit اللون الثاني يحدد الرقم الثاني
Band no.3 the multiplier. اللون الثالث يحدد عدد الصفار التي توضع إلى يمين الرقمين
Band no.4 the tolerance. اللون الرابع يحدد السماحية

Band Color	Band 1 and 2	Multiplier	Tolerance
Black	0	1	-
Brown	1	10	1%
Red	2	100	2%
Orange	3	1000	-
Yellow	4	10,000	-
Green	5	100,000	-
Blue	6	10e6	-
Violet	7	10e7	-
Grey	8	10e8	-
White	9	10e9	-
Gold	-	0.1	5%
Silver	-	0.01	10%
No Color	-	-	20%

For example:

Band 1 =Red **Band 3= Orange**
Band 2= Violet **Band 4= gold**
Resistance = 27 X 1000 = 27000ohm = 27 k ± 5%

Band 1= Brown　　　Band 3 = Red
Band 2= Black　　　Band 4 = Silver

Resistance = 10 X 100 = 1000 ohm = 1k ± 10%

The standard values available commercially are have the first 2 digits: 1,12,15,22,27,33,39,47,51,56,68 or 82

Resistors in series and parallel: المقاومات فى التوالى و التوازى

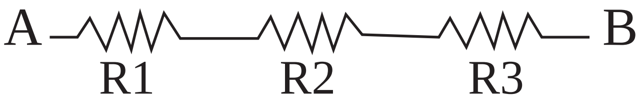
Sometimes, resistor values other than the standard available values are required for a circuit. In such a case the required value is obtained by connecting a number of resistors either in series or in parallel.

في بعض الحالات نحتاج إلى قيمة مقاومة غير القيم الموجودة والمتاحة للمقاومات وللحصول على هذه القيمة فأننا نقوم بتوصيل المقاومات الموجودة إما توالى و إما توازى .

Series Connection: التوصيل على التوالى

In series connection, the resistors are connected end to end as shown below:

توصل كما بالشكل التالي



In such a connection, the total resistance between the terminals A and B is the sum of individual resistances. وتحدد قيمتها كما بالمعادلة التالية

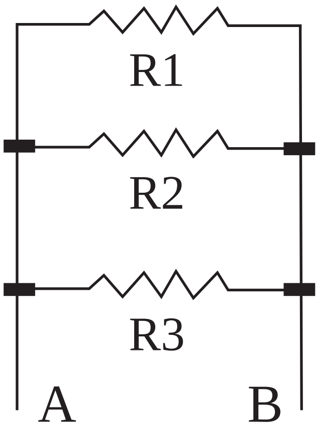
i.e., Rab = R1 + R2 + R3

For example, if a 2.2K and 3.3K resistors are connected in series, the total resistance is 2.2+3.3 = 5.5Kohm.

Parallel Connection: التوصيل على التوازى

In parallel connection, the resistors are connected as shown below:

توصل كما بالشكل التالى



In such a case, the total or effective resistance between terminals A and B is given by: وتحدد قيمتها كما بالمعادلة التالية

1/Rab = 1/R1 + 1/R2 + 1/R3

i.e. the reciprocal of the effective resistance is equal to sum of the reciprocals of the individual resistances.

If there are only two resistors, the above formula reduces to:

Rab = (R1*R2) / (R1+ R2)

e.g., if two 1K resistors are connected in parallel, the effective resistance is (1*1)/(1+1)= 1/2 = 0.5K=500 ohm.

Variable Resistors: المقاومات المتغيرة

المقاومات التي تحدثنا عنها سابقا هي المقاومات الثابتة هناك نوع آخر من المقاومات تسمى المقاومات المتغيرة و التي يمكن تغيير قيمتها أثناء وجودها في الدائرة . والمقاومات المتغيرة نوعين

١-البوتنشوميتر pots وتستخدم في حالة التغير الدائم للمقاومة .

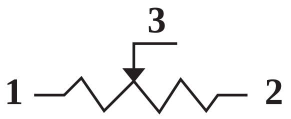
٢ - البريسيت preset وتستخدم لمعايرة الدائرة في بداية تشغيلها ولا تتغير بعد ذلك أبدا.

The resistors studied above are "fixed" type, i.e their value cannot be changed. There is another type of resistor called as the variable resistor whose resistance can be varied. They are called as "Potentiometers(pots)" or "Presets".

A potentiometer looks bigger than a preset and is used for frequent variations. The preset is used for setting up or calibrating a circuit and once done is usually not touched often. A common example of a potentiometer is the volume control on your cassette player.

Usually all pots and presets have 3 terminals, the outer 2 are fixed ends and the middle terminal gives a variable resistance along with either of the other two.

The circuit symbol is:



The terminal with the arrow(3) is the variable terminal.
The terminals 1 & 2 are fixed.

The pots value is specified as the max. value of resistance it can provide. For example, if the pots value is 10K it means its resistance can be varied between 0 to 10K ohms.

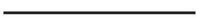
In the above figure, if you use 1 & 2 to connect the pot. to the circuit, the resistance is fixed and equal to the max. value (in this case 10K ohm)

If 1 & 3 OR 2 & 3 are used , it provides a variable resistance from 0 to 10k as the pot's shaft is rotated.

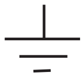
Formulae to memorize: قوانين هامة

1) $V=IR$
2) $W=I^2. R$
3) $R(series)= R1+R2$
4) $R(parallel)= (R1*R2)/(R1+R2)$

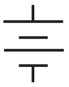
Along with the introduction to resistors, I'll present here a few basic symbols used in electronics: سوف نقدم فيما يلي الرموز الأساسية للمكونات الإلكترونية

1) 

Denotes a wire or a connection. السلك الموصل

2) 

This symbol denotes "Ground". Imagine this as the common point of all connections in a circuit. الأرضي

3) 

This denotes a battery. The upper (longer) portion is the + or positive terminal of the battery. The lower portion is the – or negative terminal of the battery.

البطارية الجزء العلوي هو الموجب والجزء السفلي هو السالب

Capacitor المكثفات

تستخدم المكثفات في الدوائر الإلكترونية لتخزين الشحنات الكهربية وهي تتكون من لوحين من مادة موصلة جيدة متوازيان يفصل بينهم فجوة صغيرة جدا من مادة عازلة ويتم شحن المكثفات بتطبيق جهد كهربي بين طرفيه وعند شحن المكثف فأنة ينتج جهد كهربي بين طرفية حتى بعد فصل مصدر الشحن وتعتمد قيمة هذا الجهد على كمية الشحنة المخزنة داخل المكثف

It is charged by applying a voltage across its terminals, and discharged by shorting the two terminals. When a capacitor is charged, a voltage develops across its terminals even when the charging source is removed. The voltage across the terminals of a capacitor is related to the amount of charge stored in it by the relation:

Voltage = Charge/Capacitance العلاقة بين الشحنة والفولت في المكثف

or

$$V = Q / C$$

Where C is the capacitance of the capacitor and is measured in a unit called 'farad', denoted by F. If 1V is developed across the terminals of a capacitor by the storage of 1C(coloumb) of charge then its capacitance is 1 F.

Usually a farad is a large value and for most of the applications the value is expressed in terms of microfarads, nanofarads or picofarads.

1 microfarad (uF) = 10e-6 or 1/1000000th of a farad.

1 nanofarad (nF) = 10e-9 farad OR 1/1000th of a mic

1 picofarad (pF) = 10e-12 farad

(in uF above, 'u' is the greek letter mu and not the english letter 'u')

Types of capacitors: أنواع المكثفات

هناك أنواع عديدة للمكثفات ولكن أهم نوعين هما

There are many types of capacitors but the two main types are:

1- Non-electrolytic

المكثفات الغير قطبية والتي يمكن توصيلها في الدائرة بدون معرفة الطرف السالب والطرف والموجب

2- Electrolytic

المكثفات القطبية والتي يجب معرفة قطبيتها قبل التوصيل في الدائرة

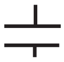
Non-Electrolytic capacitors are non-polarized, i.e they can be connected either way in a circuit without having to worry about + & -. The most common is the disc-type capacitor that we normally use in electronics. The other types are ceramic, mica etc. In almost all applications we use the disc-type capacitor which is brown in color and has the shape of a disc. Its value ranges between about a few pF to as high as 1uF. (You also get non-polarized capacitors of higher values and such capacitors have 'NP' written on them indicating Non Polarized)

Electrolytic capacitors are polarized and they are supposed to be connected in a specific way in the circuit. Their + and - terminals have to coincide with that specified in the circuit. They are much bulkier than the non-electrolytic type and hence have to be avoided when possible. They are used only if very high capacitance values are needed. Also the electrolytic capacitors are not very stable regarding their value i.e. their values change slightly with the temperature and other physical parameters. The non-electrolytic capacitors are relatively stabler. Electrolytic capacitors are available usually 1uF and upwards up to about 4700uF!
They are much costlier than the non-electrolytic capacitors.
CAUTION: Connecting an electrolytic capacitor in the wrong polarity may lead to an explosion! (electrically controlled firecrackers?)

Circuit Symbol: الرمز بالدائرة

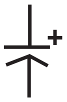
The symbol used for electrolytic and non-electrolytic capacitors are different.

The symbol for non-electrolytic capacitor is: رمز المكثفات الغير قطبية



where the dark lines indicate the two plates, and the thin lines represent the two terminals.

The symbol for electrolytic capacitor is: رمز المكثفات القطبية



The terminal marked as + is the positive (or +) terminal and the other (unmarked) terminal is the negative or - terminal. When + is not indicated, the terminal near the curved line is assumed to be negative. On the actual electrolytic package, the negative terminal is usually indicated by a black line with arrows pointing towards the negative terminal.

When you buy a capacitor at a store, you have to specify 3 things:

ثلاثة أشياء يجب معرفتها أثناء شراء المكثف

1) Electrolytic/ non-electrolytic. قطبي أو غير قطبي
2) Capacitance. السعة
3) Max. tolerable voltage. أقصى جهد يمكن للمكثف تحمله

1) Electrolytic/non-electrolytic: This depends usually on the value of the capacitance. If its less then 1uF then go for non-electrolytic and for higher values use electrolytic.
2) As mentioned above, the value of a capacitor or its capacitance id specified in uF / nF / pF
3) All capacitors have a max. voltage specified and which is the max. voltage that can be applied across its terminals. If a higher voltage is applied, it may damage the capacitor. The max. voltage for a non-electrolytic capacitor is usually a few hundred volts and is not specified in circuit diagrams since this voltage is much higher than the supply voltage of many electronic circuits. For the electrolytic capacitors, the max. voltage is almost always specified in the circuit. If its not specified, assume it to be a little higher than the supply voltage to the circuit. For example if circuit operates at 12V then the electrolytic capacitors can be purchased with a max. voltage of about 16V.Note here that as the max. voltage increases the cost of the capacitor also increases.

How to read a capacitor's value? كيفية قراءة قيمة المكثف

1- Non-Electrolytic: الغير قطبي

قيمة المكثف تكون مطبوعة علية ولكن هناك اكثر من طريقة لطباعتها سوف نناقش اشهرها

Some capacitors have their values printed in them. Unfortunately, there are various formats for printing the values and only a few can be discussed here:

1) If the printed value is like 101,102,103,204 etc then the value of the capacitor= (first 2 digits X 10 raised to the 3rd digit) pF.
For example if the value is 104 then capacitance = (10X 10e4) pF = 10e5 pF = 10e-7 F = 0.1uF
Remember a few of them: 104 = 0.1uF , 224=0.22uF , 103= 0.01uF, 102= 0.001uF

2) If the printed value is like 1K5, 100,220,10K etc,
Then capacitance = (printed value) pF
For example if the value is 10K then capacitance = 10K pF = 10X10e3 pF= 10e-8 F= 0.01uF
1K5 means 1.5K pF and so on.

2- Electrolytic: القطبية

تكون القيمة و أقصى جهد مطبوعين بالإنجليزية على المكثف

Fortunately, both the capacitance and the max. voltage are both printed on the electrolytic in plain English!

There are a few capacitance available with color band coding like in the resistors, but their value is in pF and has to be multiplied by 10e-12 after decoding the value.

Capacitors in Series and Parallel: المكثفات في التوالي و التوازي

متشابه تماما مع المقاومات مع استبدال معادلات التوالي و التوازي

(Please read the chapter on resistors before proceeding)
This is very similar to the resistors except the formula for series and parallel connections are interchanged.
If Cab is the effective capacitance of a series or parallel combination then, it is given by.

1/Cab(series) = 1/C1 + 1/C2 + 1/C3 where C1,C2,C3 are individual capacitances.

Cab(parallel) = C1 + C2+ C3

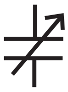
Variable Capacitors(trimmers): المكثفات المتغيرة

المكثفات المتغيرة متاحة فقط للقيم الصغيرة جدا واهم استخداماتها في أجهزة الراديو في دوائر التنغيم .

Variable capacitors are available only for very small values like pF and should be normally avoided. They, like variable resistors have three terminals for the same reasons as discussed in the chapter on resistors.

The main use of variable capacitor are in the radio and are used for tuning.

The circuit symbol of variable capacitor is:



Applications of capacitors:

Capacitors are as indispensable as the resistor in electronics. You can find them in almost every electronic circuit. They are used mainly in delay circuits like timers, noise suppression(smoothing) , oscillators to name a few.

The capacitor is used to: تستخدم المكثفات في الدوائر للأسباب الآتية

1. Block DC	منع التيار المستمر
2. Pass AC	مرور التيار المتردد
3. Store charges.	تخزين الشحنات

Formula to memorize: معادلات هامة

1) V=Q/C

2) C(parallel)= C1+C2

3) C(series)= (C1*C2)/(C1+C2)

Inductor الملفات

الحث هو قدرة الملف على إنتاج جهد كهربي بداخلة ليعاكس التغير في التيار المار خلاله وهذا يعنى أنة عند مرور تيار متغير خلال ملف فأن الملف ينتج جهد كهربي في اتجاه معاكس لتغير التيار .

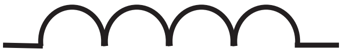
Let me be very brief here. The main purpose of this tutorial is to explain what an inductor is and how it behaves in an electronic circuit.

The definition of inductance goes like this:

"Inductance is the ability of a coil to establish (or induce) a voltage within itself to oppose changes in current through its windings".

That means when varying current flows through a coil, a voltage is induced within the coil in a direction so as to oppose the change of current through it.

The circuit symbol of an inductor is: الرمز بالدائرة



and like a resistor, it can be connected either way in a circuit, with the exception of mutually coupled coils that have to be connected in a particular way.

The unit of inductance: وحدة قياس الحث

وحدة قياس الحث هي الهنرى

The unit of inductance is 'Henry' denoted by H. Usually, in electronics smaller values of H are used like mH (millihenry).

Applications of inductors: تطبيقات الملفات

واحد من أهم تطبيقات الملفات هو الحث المتبادل وهو انه إذا تم وضع ملفين متجاورين فأنة عند مرور تيار متردد في الملف الأول ينشأ حوله مجال مغناطيسي متغير وعند تقاطع خطوط هذا المجال مع لفات الملف الثاني يتولد به جهد كهربي متغير يتسبب في مرور تيار كهربي في هذا الملف وهذه هي نظرية عمل المحولات .

One of the major applications come in from "mutually coupled" coils where the magnetic field established in one coil, 'cuts' through the other coil and hence induces a voltage in the other coil. This is called 'mutual inductance'. Such coils are widely used in transformers.

Transformers: المحولات

تستخدم المحولات في الدوائر الإلكترونية لخفض وزيادة الجهود وتنقسم إلى

١- محولات خافضة للجهد وفيها يتم خفض جهد الدخل إلى جهد أصغر في الخرج

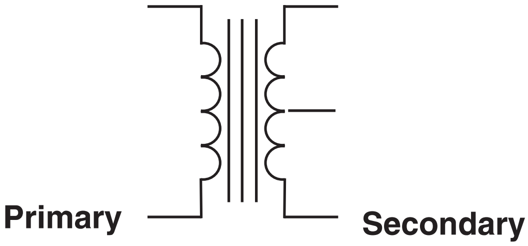
٢- محولات رافعة للجهد وفيها يتم رفع جهد الدخل إلي جهد أعلى في الخرج

They are used in electronics to step-up or step-down voltages using mutually coupled coils. When a varying voltage(like AC) is applied to one of the coils of the transformer(called the Primary winding), a voltage is 'induced' in the other coil due to mutual inductance. The second coil in which the voltage is induced is called the Secondary winding.

If by applying a higher voltage to the primary, a lower voltage is obtained at the secondary, then the transformer is called a "Step-Down" transformer. If a lower voltage produces a higher voltage then its called a Step-Up transformer.

If the transformer produces a higher voltage from a lower or vice-versa, then isn't it defying the law of energy conservation? Well, not really. We are till now looking only at the voltages and not currents. Remember that energy(per time period) is the product of voltage AND current. What really happens in a transformer is, if it produces a higher voltage form a lower, then the output current will be lower than the input, thus maintaining the total energy constant.

The circuit symbol of a transformer is:



The "extra" wire in the middle of secondary is called the "center tap" which may or may not be present in all the transformers.

Usually the voltages between the center tap and the other two taps of the secondary are equal.

Transformers are specified by the following: توصف المحولات بالآتى

1. Primary and secondary voltages. الجهد الابتدائي والجهد الثانوي
2. Current rating. نسبة التيار

For example, a 230V / 12-0-12V and 1A transformer means, the primary voltage is 230V and secondary voltages are 12V,0V,12V of the 3 tapings and can supply a maximum of 1A (this is the root-mean-square , rms value) . If you want to 12V from the transformer, then you can use the center tap and either of the other 2 end terminals.
If you use the two extreme ends, then the output will be 24V.
If the transformer's secondary is of 9-0V, it means the transformer has a secondary of 2 tapings and the voltage measured between the 2 tapings is 9V.

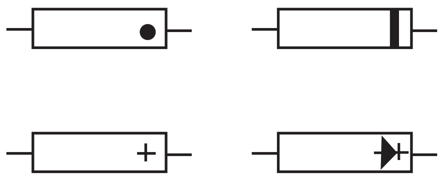
Just remember that the output of a transformer is AC and cannot be used for normal circuits and have to be converted to DC using "diodes".

Where are these transformers used?

In your T.V , computer, tape recorder , VCR and just about every electronic gadget that operates on mains. This is because if the mains voltage is 230V(or 110V), the gadgets need much lower voltages than that, say like 6V , 9V etc. These lower voltages are obtained by using a "step-down" transformer.
What about step-up transformers? They are used in inverters, which provide AC power from a battery.

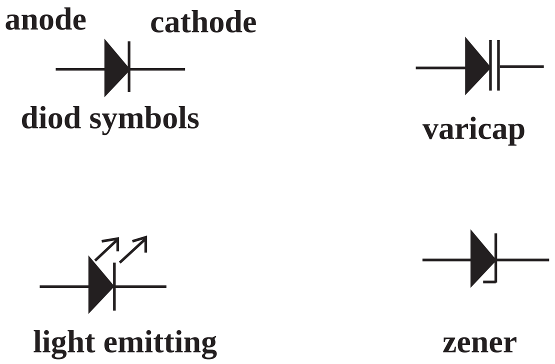
The Diode : الوصلة الثنائية

من الممكن أن نعتبر الوصلة الثنائية مثل الصمام الذي يتحكم في مرور الماء في اتجاه واحد فقط أيضا فأن الوصلة الثنائية تسمح بمرور الإلكترونات في اتجاه واحد فقط وتمنعها من المرور في الاتجاه الآخر وهذه الميزة تستخدم لمنع مرور التيار المتردد في الاتجاه المعاكس خلال الوصلة الثنائية فبذلك تستخدم الوصلة الثنائية لتحويل التيار المتردد إلى تيار مستمر ولذلك يطلق عليها لقب الموحد ولها أيضا الآلاف من التطبيقات الأخرى. الزينر هو وصلة ثنائية تمنع مرور التيار في الاتجاه المعاكس إلى أن يصل الجهد الكهربي على طرفيها إلى جهد الانهيار فتسمح بمرور التيار في الاتجاه المعاكس



Diodes are polarized, which means that they must be inserted into the PCB the correct way round. This is because an electric current will only flow through them in one direction (like air will only flow one way through a tyre valve). Diodes have two connections, an anode and a cathode. The cathode is always identified by a dot, ring or some other mark.

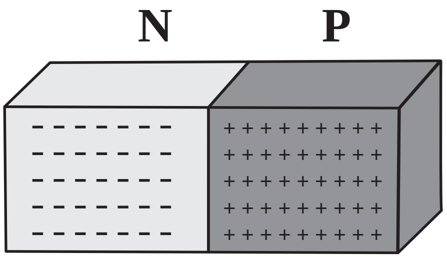
الوصلات الثنائية ذات قطبية مما يعنى أنها لابد أن توضع في الدوائر بطريقة صحيحة وهذا لان التيار سوف يمر في اتجاه واحد ولن يمر في الاتجاه المعاكس. للوصلة الثنائية طرفان الأنود والكاثود ونميز الكاثود بوضع دائرة أو نقطة أو أي علامة أخرى في ناحيته و في الدائرة المطبوعة نضع علامة الموجب ناحية الكاثود



The pcb is often marked with a + sign for the cathode end. Diodes come in all shapes and sizes. They are often marked with a type number. Detailed characteristics of a diode can be found by looking up the type number in a data book. If you know how to measure resistance with a meter then test some diodes. A good one has low resistance in one direction and high in the other. There are specialized types of diode available such as the zener and light emitting diode (LED).

Some diod circuit symbols

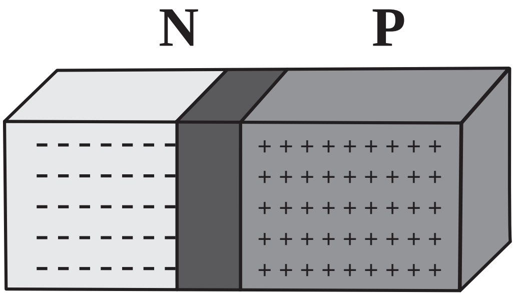
THE P-N JUNCTION



The P-N junction is made from a single crystal with the impurities diffused into it. The N end has a surplus of negative electrons. The P end has a surplus of holes.

من الشكل المقابل نستطيع أن نلاحظ أن للوصلة الثنائية طرفان سالب ممتلئ بالإلكترونات السالبة (الكاثود) وطرف موجب ممتلئ بالشحنات الموجبة (الانود)

THE BARRIER المانع أو المنطقة المزاحة



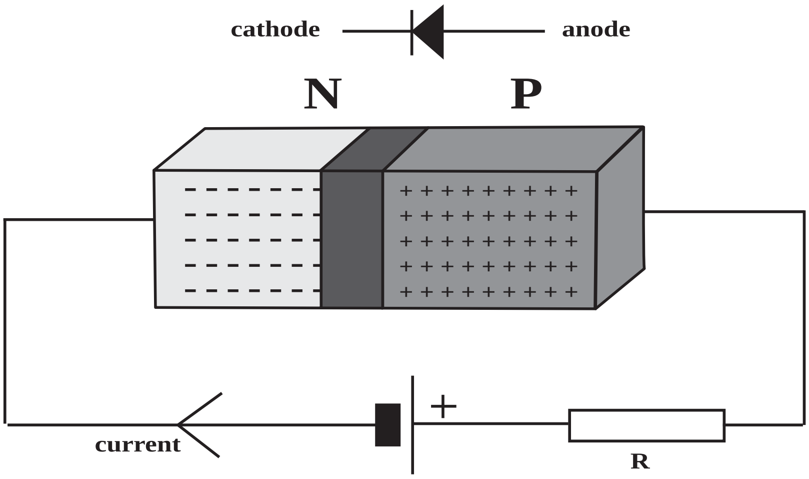
At the junction, electrons fill holes so that there are no free holes or electrons there. The actual junction becomes an insulating layer. This barrier must be overcome before current can flow through the P-N junction.

عند منطقة التقاء الجزء السالب والموجب فأن الإلكترونات السالبة تملئ الفتحات الموجبة وتكون ما يسمى بالمنطقة المزاحة .

FORWARD BIASED JUNCTION التوصيل الأمامي

Bear in mind that like charges repel and unlike attract. When a battery is connected as shown, the negative terminal pushes negative electrons towards the junction. The positive terminal pushes holes towards the junction. If the voltage is high enough then the barrier will be overcome and current will flow through the junction. There is a voltage across the diode. 0.6 for silicon, o.3 for germanium. The junction is said to be FORWARD BIASED. The P type is the anode of the diode, the N type the cathode, as shown by the diode symbol. The resistor limits the current to a safe level.

تذكر أن الشحنات المتشابهة تتنافر و المختلفة تتجاذب. عند توصيل البطارية كما بالشكل فان الطرف السالب للبطارية يدفع بالإلكترونات السالبة داخل الوصلة الثنائية والطرف الموجب للبطارية يدفع بالشحنات الموجبة من الناحية الموجبة للوصلة الثنائية وإذا كان فرق الجهد كافي فأن المنطقة المزاحة سوف يمكن التغلب عليها وسوف يمر التيار خلال الوصلة الثنائية وتكون الوصلة في وضع التوصيل الأمامي والجهد الكافي لوصلة السيليكون هو ٠,٦ فولت ولوصلة الجيرمانيوم ٠,٣ فولت.

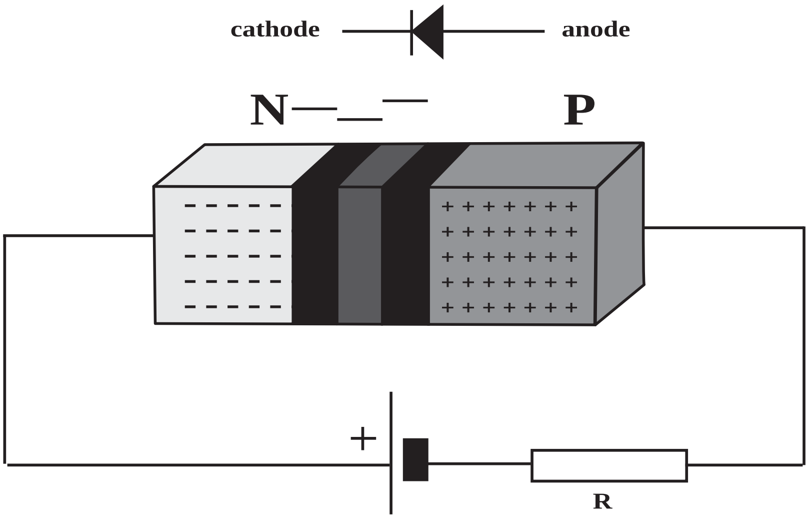


REVERSE BIASED JUNCTION التوصيل الخلفي

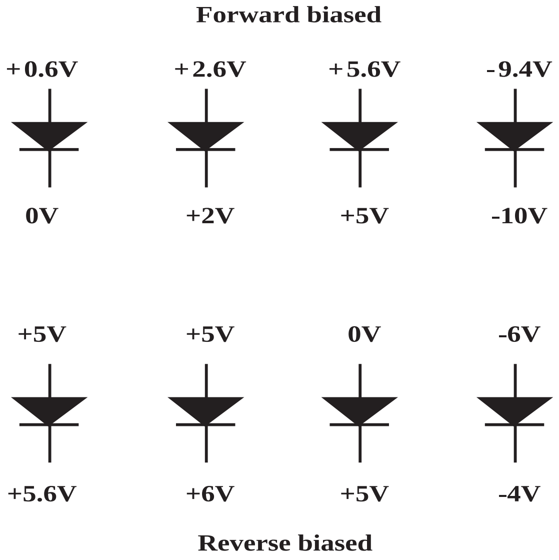
When the battery is connected as shown, the positive terminal of the battery attracts negative electrons away from the barrier. The negative terminal attracts

holes away from the barrier. The insulating barrier widens and no current flows. The junction is REVERSED BIASED. If the reverse voltage is made high enough, then the junction will break down and electron current will flow from anode to cathode (under normal conditions, current flows from cathode to anode, when forward biased).

عند توصيل البطارية كما بالشكل فأن الطرف السالب للبطارية يجتذب الشحنات الموجبة من الوصلة الثنائية والطرف الموجب للبطارية يجتذب الشحنات السالبة من الوصلة الثنائية مما يزيد من حجم المنطقة المزاحة ويمنع مرور التيار بداخلها وتكون الوصلة الثنائية في حالة التوصيل الخلفي. وإذا كان فرق الجهد مرتفع جدا فأن الوصلة سوف يحدث لها ما يسمى بالانهيار وسوف يمر التيار خلالها.



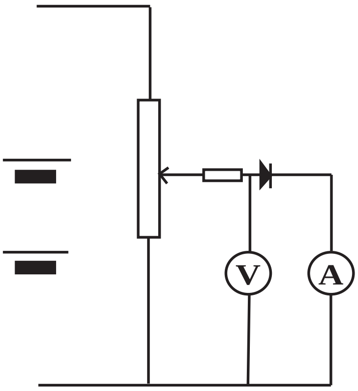
DIODE VOLTAGES فرق الجهد على الوصلة الثنائية

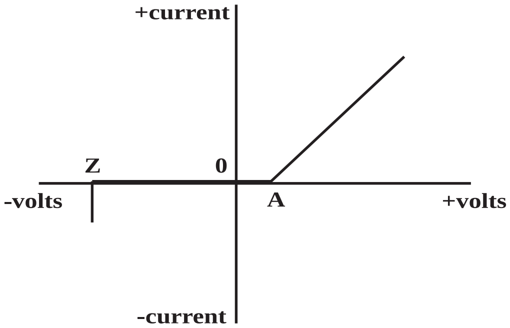


To forward bias a diode, the anode must be more positive than the cathode or LESS NEGATIVE. To reverse bias a diode, the anode must be less positive than the cathode or MORE NEGATIVE.A conducting diode has about 0.6 volts across if silicon, 0.3 volts if germanium

لكي نجعل الدايود في حالة التوصيل الأمامي لابد أن يكون الأنود اكثر إيجابية أو اقل سالبيه من الكاثود.ولكي يكون في حالة التوصيل الخلفي لابد أن يكون الأنود اقل إيجابية أو أعلى سالبيه من الكاثود.

DIODE CHARACTERISTICS خصائص الوصلة الثنائية

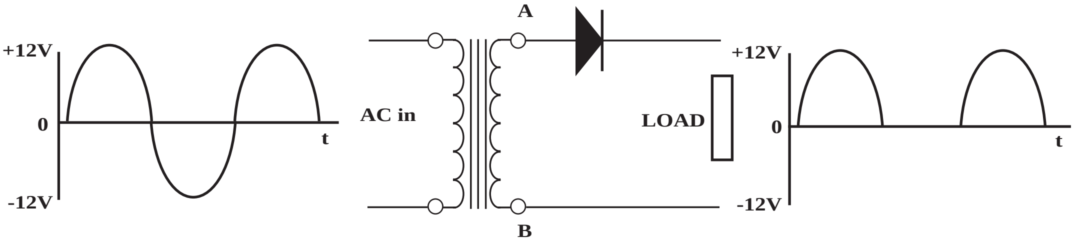




The circuit enables the forward bias voltage across the diode to be set anywhere from zero to the maximum positive voltage of the battery. The voltage and corresponding current is recorded on the meters. If these values are plotted we obtain the curve shown in the top right quarter of the graph. Note that as the voltage increases the current stays at zero, until the voltage reaches a certain value. The current then begins to increase quite rapidly. It is at this point that the barrier potential has been overcome and the diode begins to conduct. This value is about 0.6 volts for silicon diodes and 0.3 volts for germanium types. If the battery is reversed and a graph again plotted for current against voltage, we obtain the curve in the bottom left quarter of the graph. It can be seen that as the voltage is increased in the reverse direction, there is no current flowing until a certain value of voltage is reached and the current suddenly increases to a high value. This is the breakdown or Zener point and is used in Zener diodes.

لاحظ أنة كلما يزدد الجهد فأن التيار يظل قيمته صفر إلي أن يصل الجهد إلي قيمة معينة (جهد الانحياز) فأن التيار يزدد بزيادة الجهد ويمرر الدايود التيار. أما إذا عكسنا قطبية البطارية فأنة مع زيادة الجهد العكسي فأن التيار لا يمر إلي أن يصل الجهد إلى جهد الانهيار .

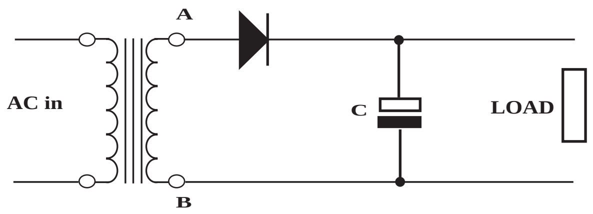
HALF WAVE RECTIFICATION توحيد نصف الموجة

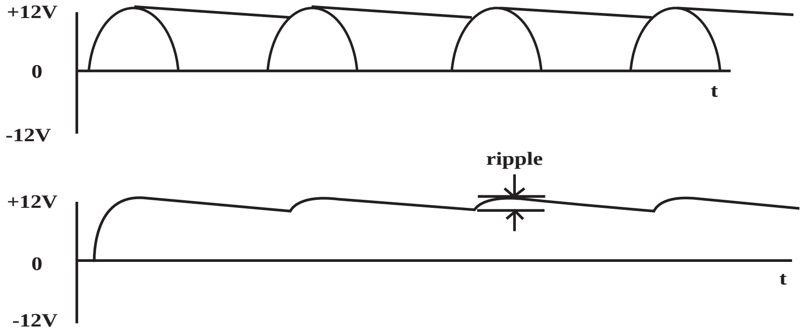


The voltage at point A does the opposite of that at point B. When A is increasing in a positive direction, B is increasing in a negative direction. It is rather like the two ends of a see-saw. During the first half cycle of the waveform shown on the left, A is positive and B is negative. The diode is forward biased and current flows around the circuit formed by the diode, the transformer winding and the load. Since the current through the load, and the voltage across the load are in the same proportions, then the voltage across the load is as shown in the right hand diagram, during the first half cycle. During the second half cycle, A and the anode are negative, B and the cathode are positive. The diode is reverse biased and no current flows. This is indicated by the horizontal line in the right hand diagram. The diode only conducts on every other half cycle. There is one pulse for every cycle in. i.e 50 pulses per second (in the UK) The diode only conducts during half the cycle. Hence, HALF-WAVE RECTIFICATION. The rectified voltage is DC (it is always positive in value). However, it is not a steady DC but PULSATING DC. It needs to be smoothed before it becomes useful. If the diode is reversed then the output voltage is negative.

حيث أننا نعرف أن الدايود لا يمرر التيار إلا في اتجاه واحد فقد فأنة يمرر الجزء الموجب فقط من التيار المتردد و يمنع الجزء السالب.

THE RESERVOIR CAPACITOR

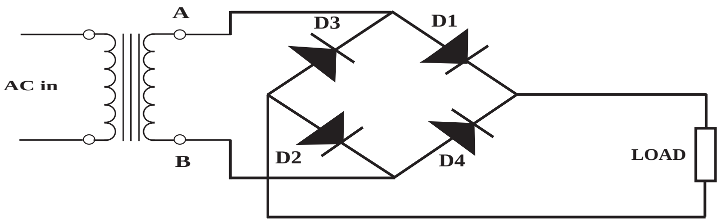


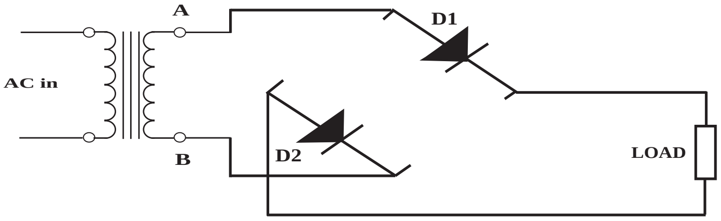


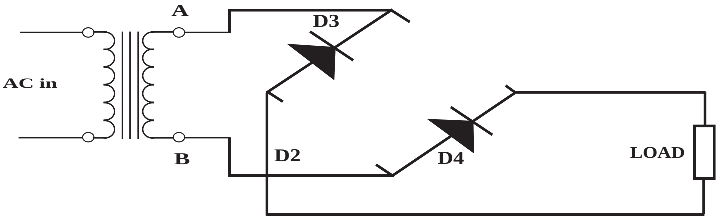
The pulsating DC from the half wave rectifier needs to be smoothed to be useful. This is done using a RESERVOIR capacitor. It is not called this because of its construction but because of its application. In the UK the weather is very variable. Sometimes we have periods of drought and sometimes periods of prolonged rain. April is very showery and occasionally we have snow in Winter. However, when I turn on the shower, the water always comes out at the same steady rate. This is because it has been stored in a reservoir and is released as required. It is the same with the reservoir capacitor. The capacitor is charged up by the pulses. It stores the pulses of voltage and the load is able to use this stored power as if it were a steady supply available from a battery. Looking at the first waveform, the red line indicates the voltage across the capacitor. When the first pulse arrives the capacitor charges up to the peak voltage. When this pulse has ended, the capacitor voltage starts to fall as the load takes energy from the capacitor. However, the voltage falls only slightly before the next pulse arrives to recharge the capacitor to the peak voltage. The result is a DC voltage with a superimposed 50 Hz (in the UK) ripple. This is shown in the second waveform. At low frequencies the capacitor is usually an electrolytic type, but at higher frequencies, where smaller values are required, other types can be used.

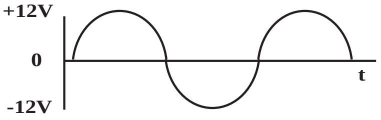
التيار المستمر المذبذب الناتج من دائرة توحيد نصف الموجة السابقة يحتاج إلي عملية تنعيم لكي يكون مفيد وهذا ما يتم باستخدام مكثف التنعيم في الشكل السابق

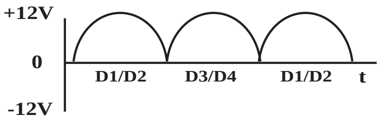
FULL WAVE RECTIFICATION توحيد كامل الموجة







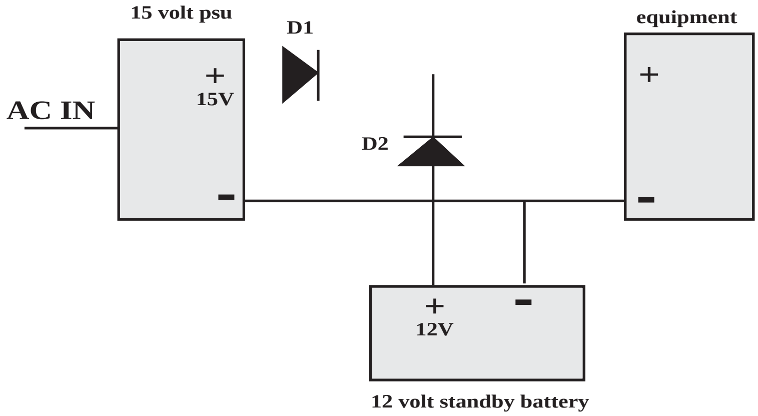




The left hand waveform shows the input voltage (50 Hz AC in the UK). The voltages at points A and B on the transformer are changing in opposite directions. When A is increasing in a positive direction, B is increasing negatively. It is like the opposite ends of a see-saw. During the first half cycle, A is positive and B is negative. D1 has positive on its anode, D2 has negative on its cathode. Both are forward biased. Current flows around the circuit formed by these diodes, the load and the transformer winding, as shown in the second diagram. The current flowing up through the load produces a pulse of voltage across the load as shown in the right hand waveform. During the next half cycle, A is negative and B is positive. D4 has positive on its anode, D3 has negative on its cathode. Both are forward biased. Current flows around the circuit as shown in the bottom diagram, again flowing in the same direction through the load and producing another pulse of voltage. Since the full cycle is used this circuit is called a FULL-WAVE rectifier. Since there are two pulses for each cycle of input, here are 100 pulses per second out (in the UK). The pulsating DC can be smoothed with a reservoir capacitor, as in the half-wave rectifier circuit. Since the pulse frequency is higher than that of the half-wave rectifier, it is easier to smooth.

في نصف الموجة الأول يعمل الديود الأول والثاني في التوصيل الأمامي ويمرر النصف الموجب وفي نصف الموجة الثاني يعمل الديود الثالث والرابع ويمرران نصف الموجة السالب في الاتجاه الموجب.

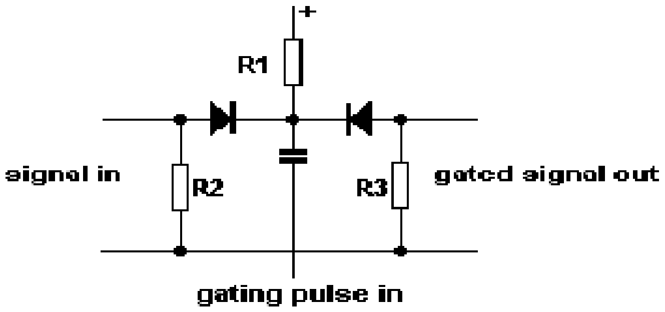
THE STEERING DIODE

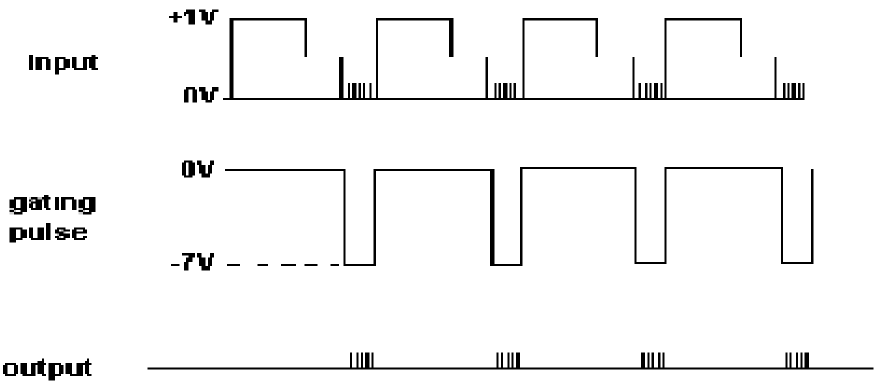


If the AC supply fails then the equipment is automatically powered by the standby battery. While the AC supply is present, D1 has +15 volts on its anode, and is forward biased. Since there is 0.6 volts across the diode, there is +14.4 volts on its cathode. This voltage powers the equipment. D2 is reverse biased since its anode is less positive than its cathode.D2 is non conducting and the battery is isolated. If the supply fails then the +15 volts disappears, and D2 becomes forward biased and conducts, to power the equipment. The diodes STEER the voltages.

تقوم الوصلتان الثنائية بتشغيل الجهاز المتصل بهما عن طريق البطارية عند انقطاع التيار المتردد

THE DIODE GATE

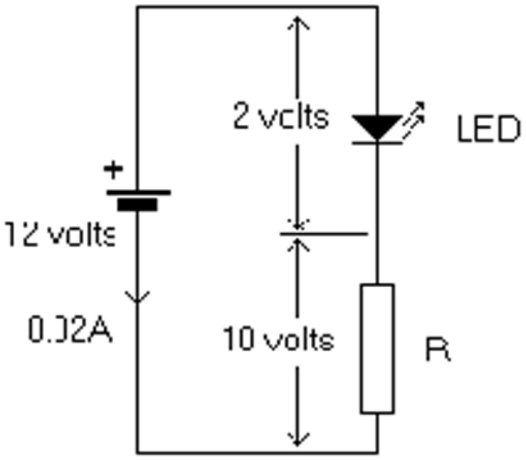




An electronic gate opens to let part of a signal through, and then shuts to reject the remainder. It's like separating sheep from goats, using a real gate. In the circuit, the cathodes of the diodes are more positive than the anodes. They are reverse biased and non conducting. The output of the circuit is isolated from the input. When the negative gating pulse comes along, the cathodes become more negative than the anodes. The diodes are forward biased and conduct. The output is connected to the input. During the duration of the gating pulse, the input signal appears at the output. as shown by the lowest waveform.

يعمل الدايود كبوابة إليكترونية حيث يسمح لجزء من الإشارة بالمرور ويمنع الجزء الأخر. في البداية يكون الكاثود اكثر إيجابية من الأنود ويكون الدايود فى وضع التوصيل العكسي لذلك لا تمر الإشارة وعندما تأتي النبضة السالبة تجعل الكاثود أكثر سالبيه من الأنود ويكون الدايود في وضع التوصيل الأمامي فتمر الإشارة.

USING LED's

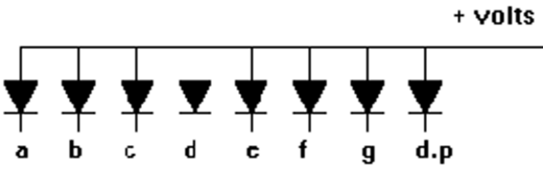


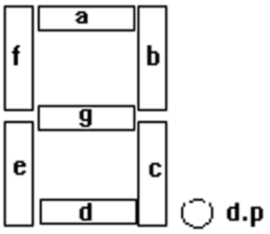
The light emitting diode (LED) is commonly used as an indicator. It can show when the power is on, act as a warning indicator, or be part of trendy jewelry etc. It needs to be fed from a DC supply, with the anode positive and the cathode negative, as shown in the diagram. To calculate the value of the series resistor we need to know the diode forward voltage and current and its connections. The necessary data can be obtained from a catalogue or data book. In our example it is 2 volts and 20mA (0.02 amps).

The cathode lead is the one nearest a "flat" on the body. Since the voltage across the diode is 2 volts and the battery voltage is 12 volts, then the voltage across the resistor is 12-2 = 10 volts. The diode is in series with the resistor, so the current through then both is the same, 0.02 amps. We now know the voltage across, and the current through the resistor. From Ohm's Law we can now calculate the value of the resistor. Resistance = Volts divided by Amps = V/I = 10/0.02 =500 ohms. Since this is not a standard value we can use a 470 or 560 ohm resistor as this application is not critical of values.

تستخدم الوصلات الثنائية المشعة للضوء كموضح أو كمبين لمرور التيار وتستخدم أيضا في دوائر الإضاءة.و لكي تشع ضوء لابد أن تغذى بجهد مستمر حيث يكون الأنود موجب و الكاثود سالب. و لحساب قيمة المقاومة التي توصل معه على التوالي لابد من معرفة جهد وتيار الانحياز للدايود و التي يتم معرفتها من كتاب البينات الخاص به.

7 SEGMENT DISPLAYS

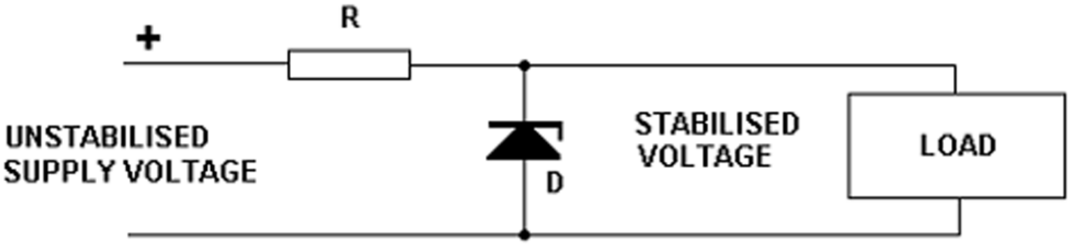




The 7 segment display is used as a numerical indicator on many types of test equipment. It is an assembly of light emitting diodes which can be powered individually. They most commonly emit red light. They are arranged and labelled as shown in the diagram. Powering all the segments will display the number 8. Powering a,b,c d and g will display the number 3. Numbers 0 to 9 can be displayed. The d.p represents a decimal point. The one shown is a common anode display since all anodes are joined together and go to the positive supply. The cathodes are connected individually to zero volts. Resistors must be placed in series with each diode to limit the current through each diode to a safe value. Early wrist watches used this type of display but they used so much current that the display was normally switched off. To see the time you had to push a button. Common cathode displays where all the cathodes are joined are also available. Liquid crystal displays do a similar job and consume much less power. Alphanumeric displays are available which can show letters as well as numbers.

تستخدم في العديد من أجهزة التوضيح الرقمي وتتركب من ثمانية ديودات مشعة للضوء يمكن تشغيل كلا منها علي حدة مرقمة و مرتبة كما بالشكل. وبذلك يمكن كتابة جميع الأرقام من رقم ١ إلى رقم ٩ وكذلك العلامة العشرية بالدايود d.p والكاثود لكل الديودات يكون متصل بالأرضي (0 VOLT) والانود يعمل لكلا منهم على حدة. كما يجب حساب المقاومة التي سوف توضع مع الانود علي التوالي بعناية للحد من التيار المار في الدايود.

THE ZENER DIODE



**The Zener diode is operated in reverse bias mode (positive on its cathode).
It relies on the reverse breakdown voltage occurring at a specified value.
This value is printed on it. It has two main applications.**

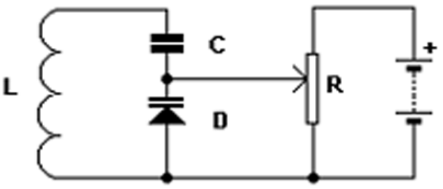
1. as a reference source, where the voltage across it is compared with another voltage.

2. as a voltage regulator, smoothing out any voltages variations occurring in the supply voltage across the load.

When being used a voltage regulator, if the voltage across the load tries to rise then the Zener takes more current.
The increase in current through the resistor causes an increase in voltage dropped across the resistor.
This increase in voltage across the resistor causes the voltage across the load to remain at its correct value.
In a similar manner, if the voltage across the load tries to fall, then the Zener takes less current.
The current through the resistor and the voltage across the resistor both fall.
The voltage across the load remains at its correct value.

يعمل الزينر في حالة التوصيل العكسي وذلك عند وصول فرق الجهد بين طرفية إلي قيمة معينة تكون مطبوعة علية. وله اثنين من التطبيقات الرئيسية هما
١- كمصدر يقارن به فرق الجهد حيث يقارن فرق الجهد بين طرفيه بالجهود الأخرى
٢- كمنظم للجهد

THE VARICAP DIODE



When the junction diode is reverse biased, the insulating barrier widens.
The higher the reverse voltage the wider the barrier becomes. The barrier forms the dielectric, of variable width, of a capacitor.

The N and P type cathode and anode are the two plates of the capacitor. In the diagram, the diode and coil form a resonant circuit. The capacitance of the diode, and thereby the resonant frequency, is varied by means of the potentiometer controlling the reverse voltage across the varicap. The capacitor prevents the coil shorting out the voltage across the potentiometer.

عند تطبيق جهد عكسي علي الوصلة الثنائية فأن المنطقة المزاحة أو المانع (Barrier) تتسع وكلما زاد هذا الجهد تزداد مساحة هذه المنطقة وتكون عازل لمكثف متغير الاتساع ويكون الأنود والكاثود قطبي المكثف. وفي الشكل السابق فأن الوصلة الثنائية والملف يكونا دائرة رنين. ونتحكم في سعة الدايود و بالتالي في تردد الرنين عن طريق المقاومة المتغيرة.

Basic Diode Definitions

diode : **a two-element active electronic device containing an anode and a cathode, characterized by the ability to pass an electric current more easily from cathode to anode than from anode to cathode; a diode can be in the form of an electron tube, semiconductor device, or crystal device.**

diode theory : **a theory stating that for a semiconductor in which the barrier thickness is comparable to or smaller than the free path of the carriers, the carriers cross the barrier without being scattered, in a manner similar to that of a vacuum-tube diode.**

diode amplifier: **a microwave amplifier using a specially designed diode in the tuned cavity of a microwave electron tube; its center frequencies range from about 1 to 100 GHz.**

diode bridge : a circuit consisting of four diodes connected in a bridge configuration; the polarity of the output remains the same regardless of the polarity of the input; used primarily for converting alternating current to pulsating direct current.

diode characteristic: the characteristic of a multi electrode vacuum tube to form a virtual diode between the cathode and all other electrodes in the tube.

diode clamping circuit: a circuit that uses diodes to add a fixed voltage to a waveform in order to establish a specified reference level for the waveform. Also, DC RESTORER. a circuit that uses diodes to add a fixed voltage to a waveform in order to establish a specified reference level for the waveform. Also, DC RESTORER. 2. a circuit that uses a diode to hold a voltage to some fixed value. a circuit that uses a diode to hold a voltage to some fixed value.

diode clipping circuit: a circuit that uses diodes to prevent a signal from reaching the peak amplitude it would otherwise attain; this results in a distorted waveform whose peaks appear clipped.

diode demodulator: a demodulator that uses one or more crystal or electron-tube diodes to provide a rectified output with an average value proportional to the original modulation. Also, DIODE DETECTOR.

diode detector: see DIODE DEMODULATOR

diode forward voltage: the voltage applied across a diode with a polarity and amplitude that cause electrical current to flow forward, from anode to cathode.

diode function generator: a circuit that produces specific waveforms, such as sine waves or saw tooth waves, and in which the output waveform characteristics are determined by an amplifier connected to an adjustable wave-shaping network, consisting mainly of diodes and resistances.

diode matrix: any number of diodes connected in a two-dimensional array configuration, used primarily for decoding digital inputs.

diode limiter : a limiter circuit that uses one or more diodes to prevent a signal from exceeding a predetermined peak amplitude; when the specified amplitude is reached, the limiter acts as a clipper circuit to prevent a further increase in amplitude.

diode mixer: circuit that uses the nonlinear characteristics of a diode to mix two frequencies in order to produce the sum or difference of the two original frequencies; its main application is in super heterodyne radio receivers.

diode modulator : a circuit that uses diodes to combine a modulating signal with a carrier signal.

diode oscillator: 1. an oscillator based on the breakdown or negative resistance characteristics of some diodes. an oscillator based on the breakdown or negative resistance characteristics of some diodes. 2. an oscillator that makes use of the negative anode-to-cathode resistance of a tube diode when operated at ultrahigh frequencies. an oscillator that makes use of the negative anode-to-cathode resistance of a tube diode when operated at ultrahigh frequencies.

diode peak detector: a circuit, usually consisting of a diode and capacitor in series, used to detect and store the peak amplitude value of a signal.

diode-pentode: an electron tube in which a diode and a pentode are contained within the same envelope, usually with a common cathode.

diode rectifier: a circuit containing one or more diodes, usually part of a power supply, that converts ac input to a pulsating dc output.

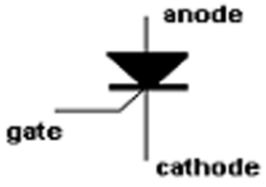
diode switch: a circuit containing several diodes that performs switching functions by applying forward or reverse bias voltages to the anodes of the diodes in sequence: a forward voltage allows the diode to conduct, passing the signal on its cathode; a reverse voltage causes the diode to act as an open switch.

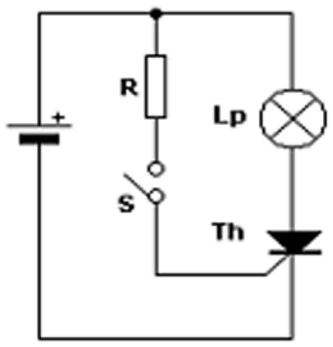
diode transistor logic: a logic circuit consisting of one or more diode gates connected to the base of a transistor, in which the AND or OR functions performed by the diode gates control the on-off status of the transistor.

diode voltage regulator: a simple voltage regulator circuit that depends for its operation on the characteristic of a Zener diode when operating in the reverse-biased breakdown region. Also, ZENER DIODE VOLTAGE REGULATOR.

diode-triode: an electron tube in which a diode and a triode are contained within the same envelope, usually with a common cathode.

THE THYRISTOR : الثيرستور

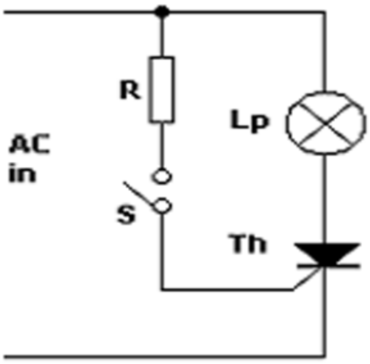


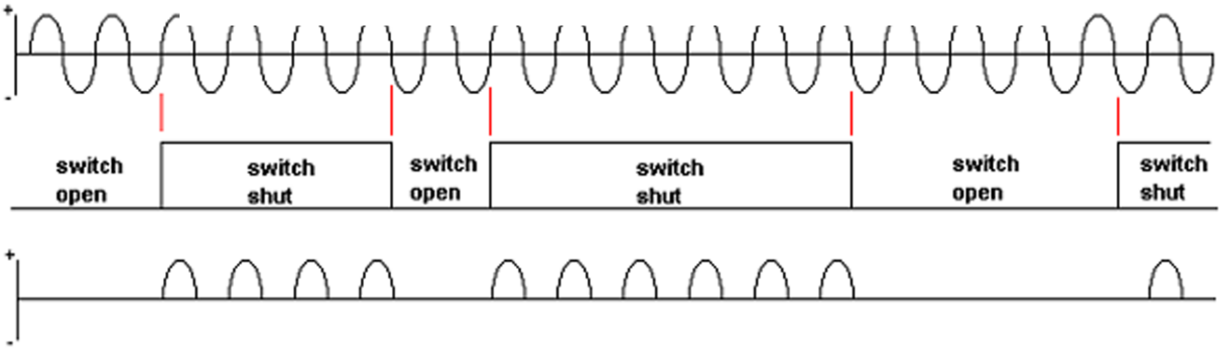


The thyristor is also known as the silicon controlled rectifier (S.C.R.). It has the same characteristics as the diode, current flowing from cathode to anode, when the anode is positive with respect to the cathode.
However, it will only do this when the gate is also positive with respect to the cathode. In the circuit, with the switch open as shown, no current flows. When the switch is closed, the diode begins to conduct and current flows from cathode to anode. There is a problem. If the switch is now opened, current continues to flow. Conduction can be stopped by removing the the cathode/anode voltage. Another method of stopping current flow is to reverse the polarity of the cathode/anode voltage. If the thyristor is used with an ac supply then it will conduct on the positive half cycles and automatically switch off during the negative half cycles. The resistor in series with the gate connection limits the gate current to a safe value.

له نفس خصائص الدايود أي انه يمرر التيار عندما يكون الأنود اكثر إيجابية من الكاثود ولكن بشرط أن تكون البوابة gate أيضا اكثر إيجابية من الكاثود. وفى الدائرة السابقة عندما يكون المفتاح s مفتوح فأن التيار لا يمر أما إذا قمنا بغلقه يمر التيار من الكاثود إلي الانود ويظل التيار يمر حتى إذا تم فتح المفتاح مرة أخرى ويقف مرور التيار إذا عكسنا قطبية كلا من الانود والكاثود. أما إذا استخدمنا الثيرستور مع التيار المتردد فأنة سوف يمرر الجزء الموجب منة فقط .

BURST TRIGGERING THE THYRISTOR





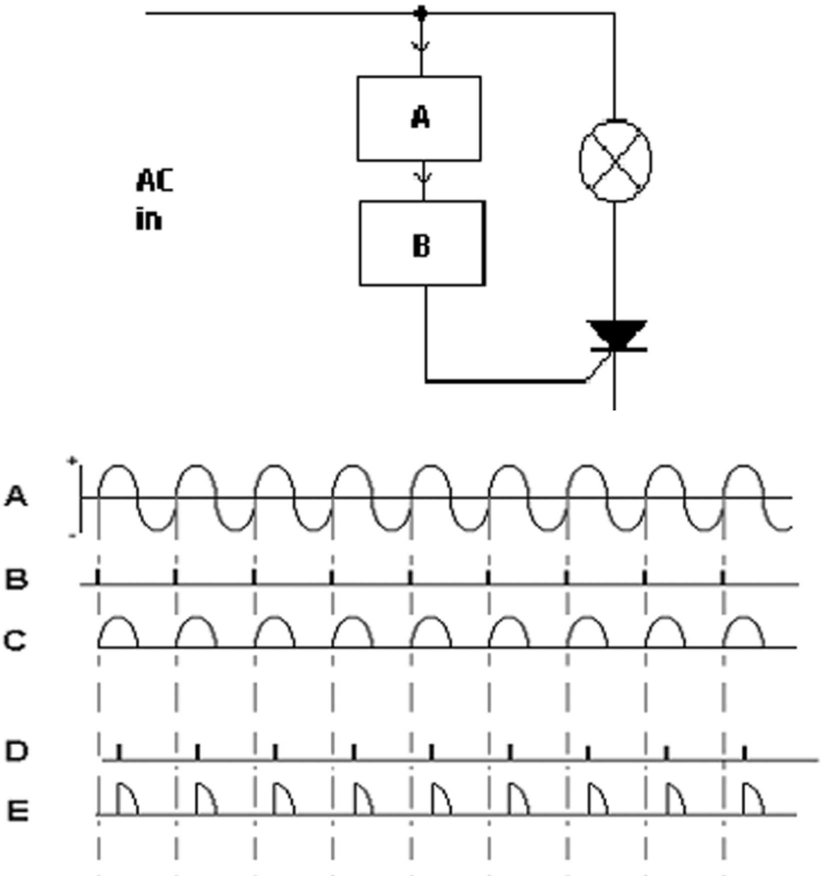
The top waveform shows the ac supply.
The middle waveform shows the switch operation.
When the switch is closed, the gate and anode go positive on the first positive half cycle, and the thyristor conducts during this period.
On the next half cycle they go negative and no current flows.
As long as the switch is closed, the thyristor conducts on the positive half cycles only.

When the switch is opened, the thyristor ceases to conduct on the next negative half cycle, and remains non conducting.
The bottom waveform shows the current through the thyristor and lamp.
The current comes in BURSTS.

If the lamp is replaced by a heater, and the switch replaced by a thermostat then it would provide automatic temperature control for an oven.

عندما يكون المفتاح مغلق فأن الثيرستور يمرر التيار في النصف الموجب من التيار المتردد فقط. وعند فتح المفتاح فأن التيار لا يمر . فى الدائرة السابقة إذا استبدلنا المصباح بسخان والمفتاح بثرموستات يمكن استخدام هذه الدائرة للتحكم في فرن تسخين .

THE THYRISTOR WITH PHASE CONTROL

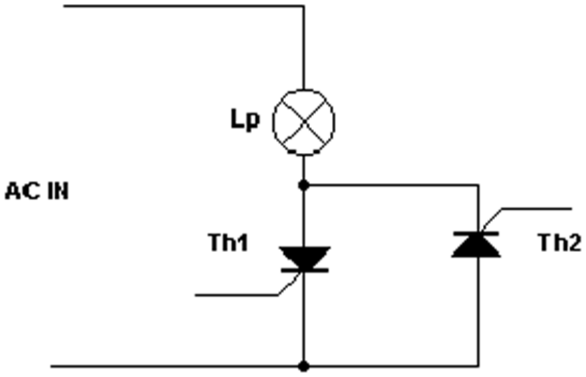


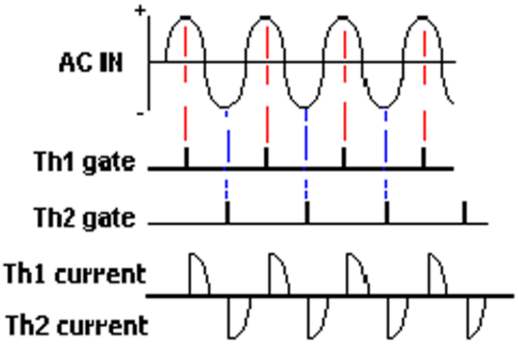
In the circuit diagram, block A generates pulses at the same frequency as the ac power supply.
Block B is a phase shift circuit which enables the phase of the pulses to be shifted with respect the ac supply. These pulses are applied to the gate.
In waveforms A and B, the gate pulses coincide with the start of the positive half cycles of the mains supply. They turn the thyristor on, and current flows for the complete half cycle. There is no current flow during negative half cycles.

The current flow is shown at C. Waveform D shows the gate pulses shifted and occurring half way through the positive half cycles of the ac supply. The thyristor starts to conduct at this time. Current flow is shown at E. F and G show the gate pulses occurring near the end of the positive half cycles, and current flowing for a very short time. The circuit acts as a lamp dimmer. However, current only flows during half of the ac cycle, and full brightness cannot be achieved. The high power thyristor circuits can be isolated from the control circuits by means of transformers or opto isolators.

في الدائرة السابقة يقوم **A** بتوليد نبضات لها نفس تردد مصدر التيار المتردد. **B** هي دائرة الإزاحة لطور النبضات الناتجة من **A** . هذه النبضات يتم إدخالها لبوابة الثيرستور . كلما زادات أزاحه الإشارة كلما قلت المساحة الذي يمرر فيها الثيرستور التيار.

FULL WAVE CONTROL OF THE THYRISTOR



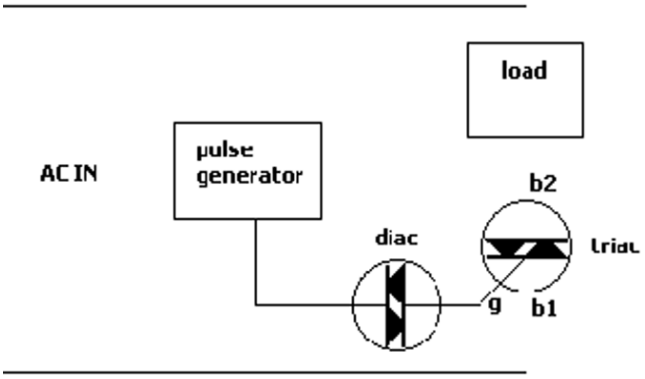


To obtain full wave operation, so that the lamp can be provided with the full ac supply voltage, two thyristors are required as shown.
Th1 is triggered during the positive half cycles of the ac supply, and Th2 during the negative half cycles.
The waveforms show the thyristors being triggered halfway through each half cycle and the current through the lamp would be the sum of the two currents.
The lamp will be at about half brightness
A pulse generator and a phase shift circuit is necessary to provide gate pulses which can adjust the power from minimum to maximum.
Since the gate voltages have to be positive with respect to the cathodes, attention must be paid to the polarity of the gating pulses with respect each other.
The high power ac circuit can be isolated from the control circuits by means of transformers or opto isolators.

لكي نجعل الثيرستور يعمل في الجزئيين السالب والموجب بالنسبة للتيار المتردد نقوم بالتوصيل كما بالدائرة السابقة حيث يعمل الثيرستور الأول في النصف الموجب والثاني في النصف السالب.

THE TRIAC AND DIAC

The triac conducts in both directions and provides full wave control of power. Variable phase trigger pulse are provided by the pulse generator and are positive with respect b1.

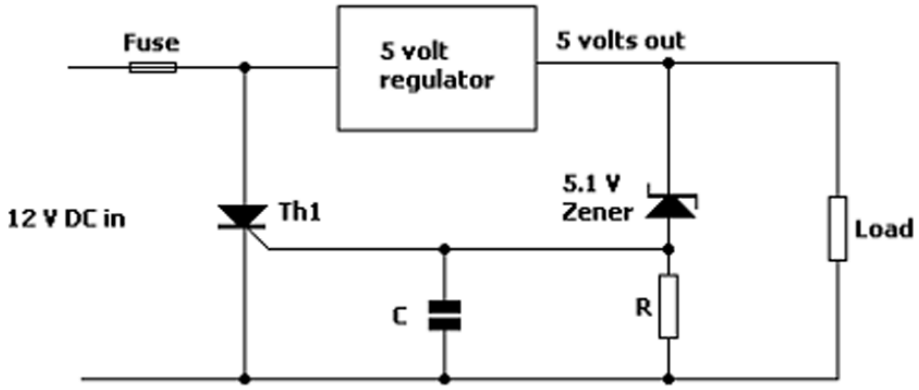


The diac is high resistance below a certain voltage, say 30 volts, but when the applied voltage exceeds this value, it goes low resistance and conducts, applying a pulse to the gate.It gives more reliable triggering of the triac.

يعمل الترياك في الاتجاهين السالب والموجب للتيار المتردد. و الدايك لا يعمل ألا عند فولت معين وليكن **30 V** .

THE CROWBAR

هذه الدائرة تستخدم لحماية الحمل إذا ارتفع الجهد عن حد معين . حيث تقوم دائرة التنظيم **(5V regulator)** بخفض الجهد من ١٢ فولت إلى ٥ فولت لتغذية الحمل فإذا قامت بتمرير ٥,١ فولت يقوم الزينر بتمرير التيار لبوابة الثيرستور الذي يقوم بفصل الفيوز **(fuse)** لحماية الحمل **(load)** .



The 12 volts input is stepped down to 5 volts by the regulator. If the regulator goes faulty, 12 volts could be applied to the load, damaging it. However, if the regulator output goes above 5.1 volts, then the zener diode conducts. Current flowing through the resistor provides a voltage across it, which triggers the gate of the thyristor. The large current through the thyristor blows the fuse and protects the load. Crude but effective.

Transistor: الوصلة الثلاثية

لكي يمكننا أن نلم بتأثير الترانزيستور في الدوائر الإلكترونية لابد أن نفهم كيف يستطيع الترانزيستور أن يتحول من حالة التوصيل إلى حالة العزل بناءا على قطبية فولت الانحياز المطبق علية والترانزيستور يوجد في جميع الأجهزة الكهربية وله وظيفتان هما

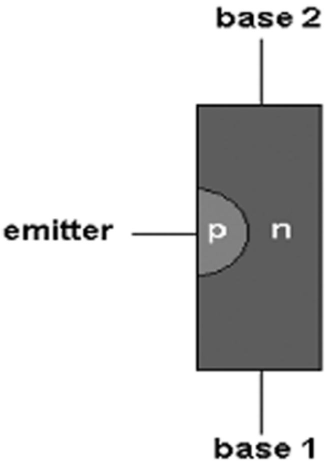
١- تكبير التيار والفولت

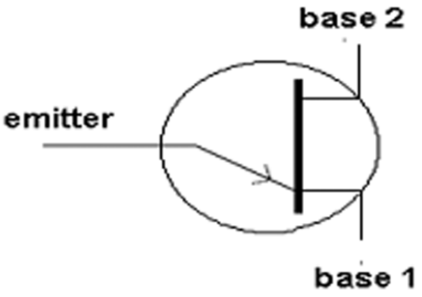
٢- عمليات الفتح والغلق الإلكتروني

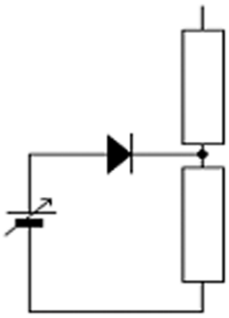
A transistor a small electronic component that is found in virtually every electronic device. It has two basic applications. The first, modulation of an electronic current, came first in the form of an amplification of an electric signal

in a radio. The second application, switching, is of utmost importance in computer operations which are based on millions of lightning fast on-off decisions. The transistor is an integral component of an integrated circuit, the brains of a computer.

THE UNIJUNCTION TRANSISTOR الترانزيستور أحادى الوصلة



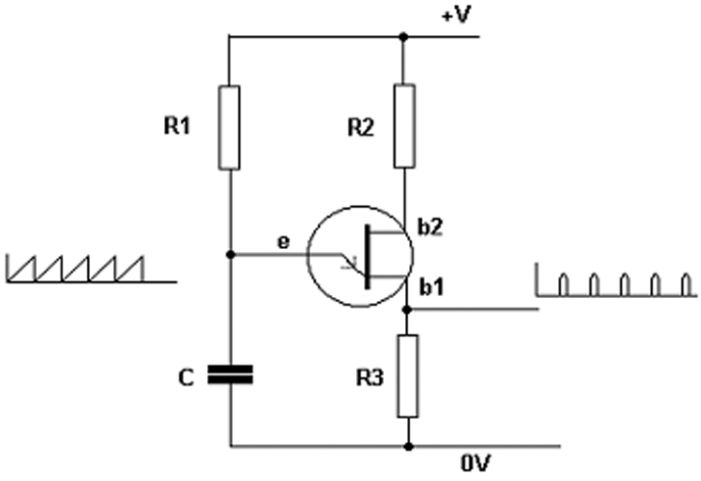




يتكون من قاعدتين و مشع توصل القاعدة الأولى بالأرضي و الثانية بالموجب وتبلغ المقاومة بينهما 10k .

The unijunction transistor (UJT) is made of a bar of N type material with a P type junction (the emitter) near the center. Base 1 is connected to zero volts and base 2 to the positive supply. The resistance between the two bases (the INTERBASE RESISTANCE) is typically 10k.

With the emitter unconnected, the bar acts as a potential divider, and about 0.5 volts appears at the emitter. If a voltage is connected to the emitter, as long as it is less than 0.5 volts, nothing happens, as the P-N junction is reversed biased. (see the right hand diagram).When the emitter voltage exceeds 0.5 volts, the junction is forward biased and emitter current will flow. This increase in current is equal to a reduction of resistance between base 1 and the emitter. This causes the emitter voltage to fall.



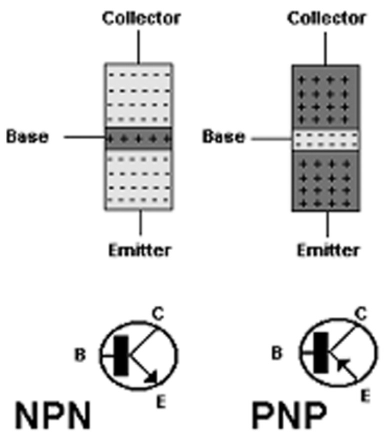
In the circuit, C charges via R1.

When the voltage across C exceeds 0.6 volts, the b1/emitter junction goes low resistance and discharges C. The result is a saw tooth waveform across C. There is also a pulse of current through R3 , giving a pulse of voltage across it. This circuit is called a relaxation oscillator. The voltage across C charges up slowly then suddenly relaxes. The circuit is often used to trigger thyristor circuits.

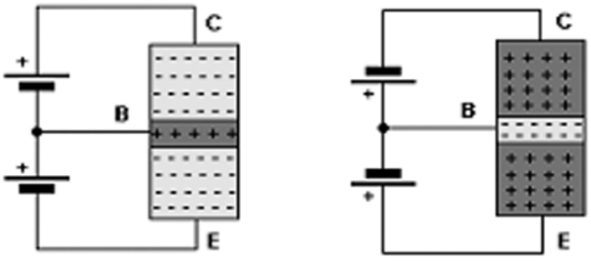
THE JUNCTION TRANSISTOR الترانزيستور ثنائي القطبية

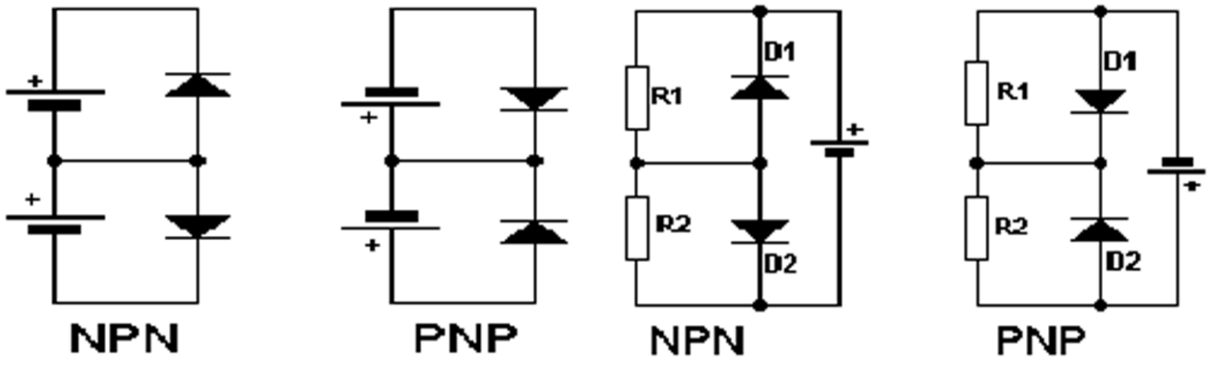
يتكون من قاعدة (base) و مشع(emitter) ومجمع (collector) وهو ثنائي القطبية (bipolar).

Junction transistors consist of two junctions made from N-type and P-type semiconductor materials and are called bipolar transistors (two polarities). They have three connections, emitter, base and collector.



JUNCTION TRANSISTOR BIASING انحياز الترانزيستور ثنائي القطبية

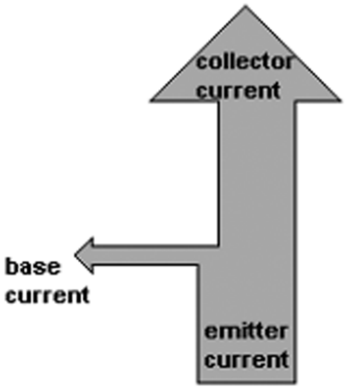




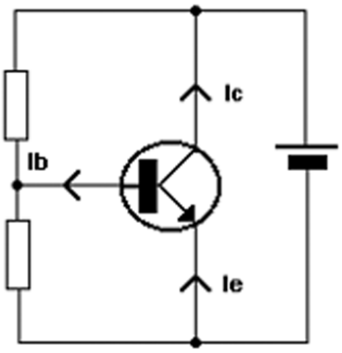
الوصلة بين القاعدة والمشع تكون في وضع التوصيل الأمامي . والوصلة بين المجمع والقاعدة تكون في وضع التوصيل الخلفي .

The emitter/base junction is forward biased. The collector/base junction is reversed biased. There is an explanation of biasing on one of the diode junction pages. The middle diagram shows the two junctions as two diodes. Of course, you can't make a transistor like this but it helps to understand the forward and reverse biasing. The anodes are positive with respect the cathodes for forward biasing. They are negative with respect to the cathodes for reverse biasing. The bottom diagram shows the junctions being correctly biased using just one battery. Note that there is 0.6 volts across the base/emitter junction when it is forward biased, for a silicon transistor. (0.3 volts for a germanium one).

TRANSISTOR CURRENTS التيار المار في الترانزيستور



IE = IB + IC



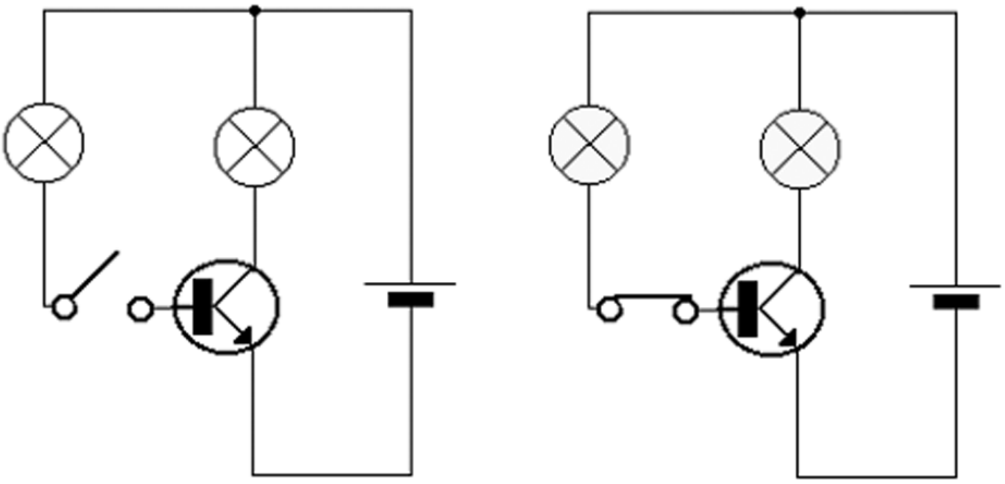
The forward biased base/emitter junction causes electrons to be attracted from the emitter area towards the base. Arriving in the base area, most of the negative electrons come under the influence of the more positive collector and are attracted by it. This is shown in the left hand drawing, where the base current plus collector current equals the emitter current. Alpha gain is collector current divided by emitter current, and is always less than 1. Beta gain is collector current divided by base current and can be a fairly high number. Therefore, causing a small base current to flow makes a much larger collector current flow. A small base current controls a large collector current. There is 0.6 volts across the base/emitter junction, when it is forward biased. (0.3 volts for germanium).

التيار الناتج من المشع يساوي مجموع التيار المار بالقاعدة و المجمع $I_e = I_b + I_c$

و يجب معرفة عاملان مهمان للترانزيستور هما **beta gain** و **alpha gain** حيث

Beta = I_c / I_b **Alpha = I_c / I_e**

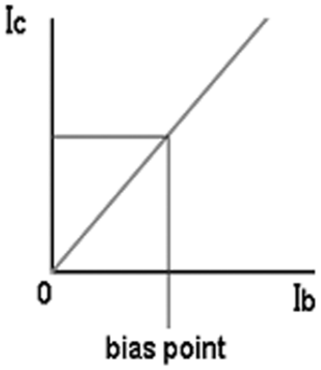
THE TRANSISTOR AS A SWITCH الترانزيستور كمفتاح فتح وغلق

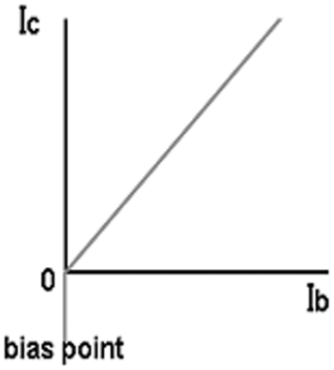


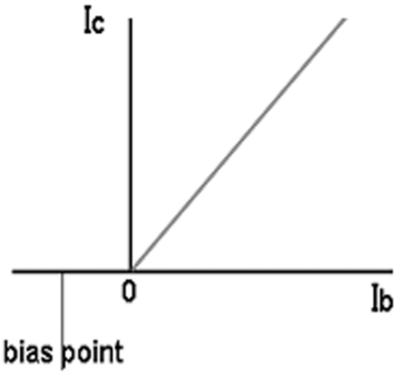
عندما يكون المفتاح مفتوح لا يمر تيار القاعدة وكذلك تيار المجمع . وعند غلق المفتاح يمر تيار القاعدة وبالتالي تيار المجمع . ينخفض جهد البطارية علي المصباح مما يؤدي إلى انخفاض جهد المجمع إلى قيمة منخفضة جدا. ويكون الترانزيستور في حالة تشبع.

With the switch open, no base current flows, therefore no collector current can flow. The transistor is said to be CUT OFF. With the switch closed, base current flows causing collector current to flow. The battery voltage is dropped across the lamp causing the collector voltage to fall to a very low value. The transistor is said to be SATURATED.

CLASS A, B AND C BIAS

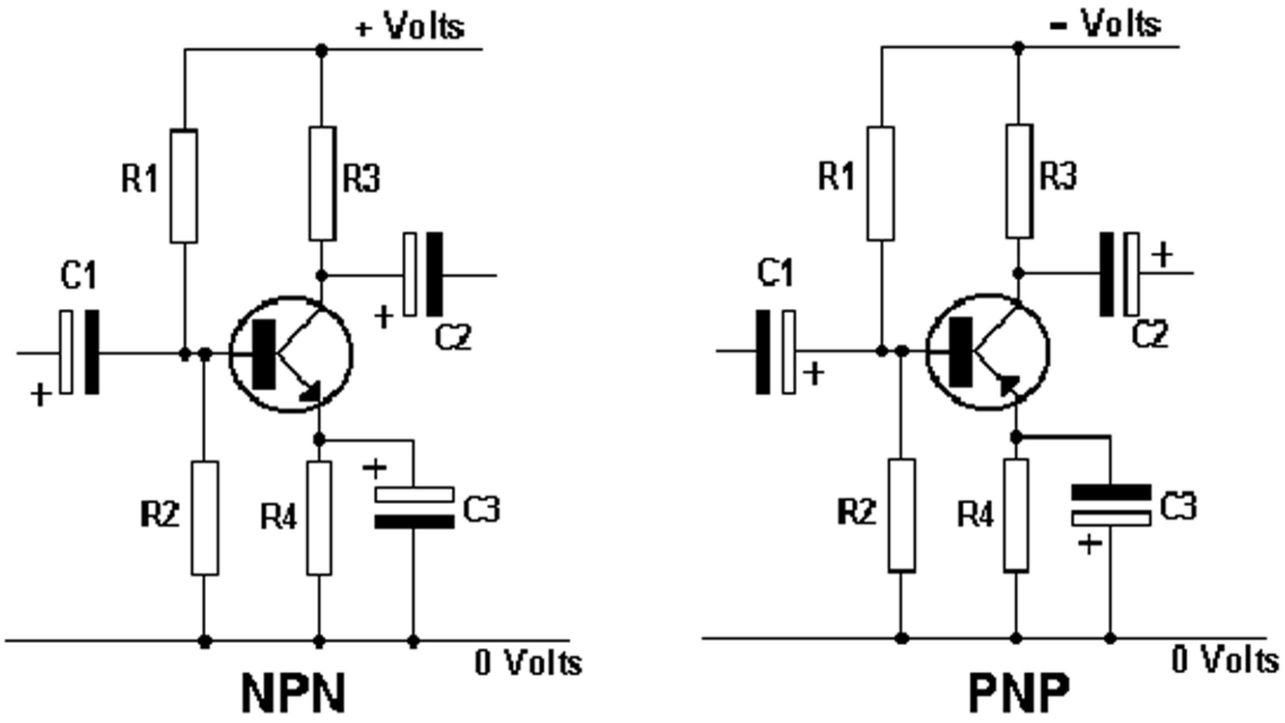






With class A bias, the base current is set so that collector current flows. Increasing or decreasing base current causes collector current to increase and decrease. With class B bias, the base current is set to zero. No collector current flows and the transistor is CUT OFF. The collector current can only be made to increase from this point, not decrease, by increasing the bias. With class C bias the bias point is set well below cut off. Collector current can only be made to flow by increasing the bias point considerably above its present value.

THE SMALL SIGNAL AMPLIFIER مكبر إشارة



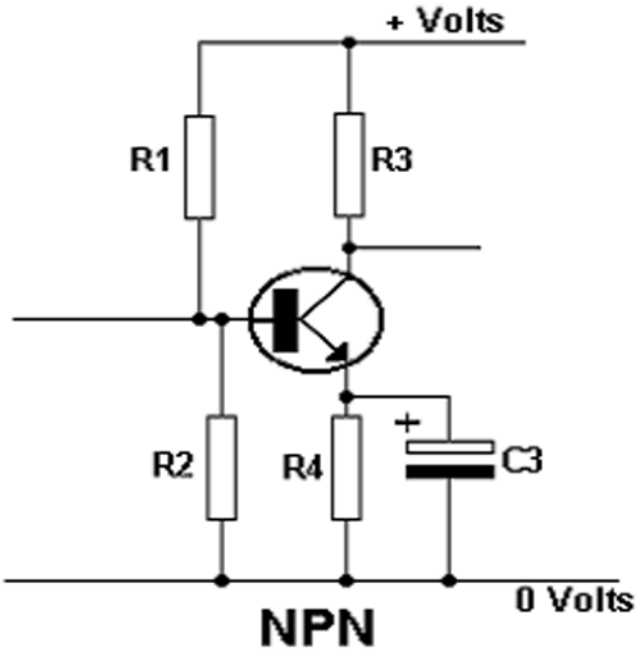
نوعي الترانزيستور ال npn وال pnp متعاكسان في القطبية ولذلك نعكس قطبية المكثفات في الدائرتين. المقاومتان R1 و R2 يحددان نقطة انحياز القاعدة و المقاومة R3 هي مقاومة الحمل و المقاومة R4 لضبط تيار المشع . المكثفان C1 و C2 يعملان علي مرور التيار المتردد و منع التيار المستمر .

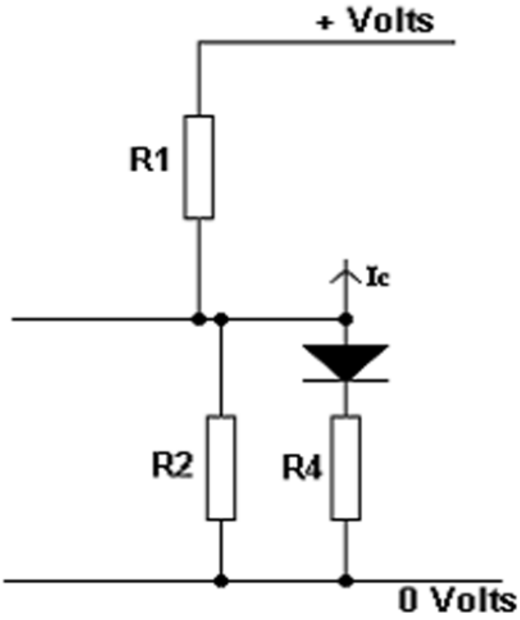
The two transistor types have opposite polarity power supplies. The polarity of the capacitors is reversed. If the transistors have the same characteristics, then resistor values are the same in both circuits. R1 and R2 are the base bias resistors, setting the bias point. R3 is the collector load resistor. R4 is the emitter stabilizing resistor. C3 is the emitter decoupling capacitor. C1 and C2 are coupling capacitors which allow ac signals to pass but block dc.

BIASING A TRANSISTOR انحياز الترانزيستور

Choose a general purpose transistor with a beta gain higher than 100. Decide on the collector current. The base bias voltage is be 1/3 of the supply voltage. The current through the base bias potential divider is to be 1/10 of the collector current. Calculate the two base resistor values, R1 and R2. The emitter voltage is 0.6 volts lower than the base voltage. The value of the emitter resistor R4 is the emitter voltage divided by the collector current. The value of the collector resistor R3 is the supply voltage divided by three times the collector current. The values of the capacitors depend upon the application. Study a few circuits. For common collector and common base some of the capacitors are connected differently.

EMITTER STABILISATION

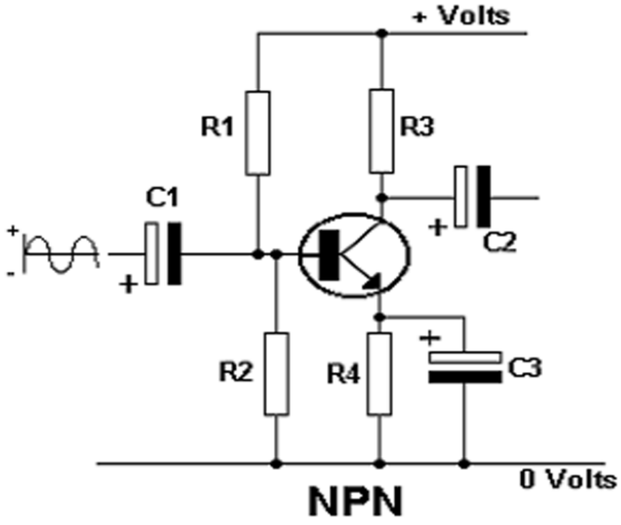




R1 and R2 bias the transistor in class A so that a steady dc collector flows. R4 is the emitter stabilizing resistor. When collector current flows it causes the transistor to heat up. This causes the base current to increase which in turn causes the collector current to rise. This rise in collector current causes the temperature to increase even more, and the base and collector currents continue increasing. This behavior is called THERMAL RUNAWAY and will destroy the transistor. If we consider the emitter/base junction as a diode as shown in the right hand diagram we can see that the base (anode) voltage is fixed by R1 and R2. If the collector current tries to rise due to heating, then the voltage across R4 will try to rise, making the emitter (cathode) more positive. This would reduce the voltage across the junction (diode) making it less forward biased and reducing the base current and hence the collector current, which was trying to rise. Therefore the circuit has been stabilized against thermal runaway. However, if an ac signal is applied to the base, the varying collector current will cause a varying voltage across the emitter resistor. This voltage will follow the base voltage. This means that the base/emitter (anode/cathode) voltage will be constant instead of the base varying with respect to the emitter. To fix this, the emitter is joined to earth, as far as the ac signal is concerned, by the emitter decoupling capacitor.

تعمل R4 علي زيادة فرق جهد المشع عند زيادة التيار المار فيه مما يقلل من التيار المار في القاعدة و بالتالي التيار المار من المشع مما يجعل الترانزيستور في حالة ثابتة ولا يحترق بسبب ارتفاع درجة حرارته.

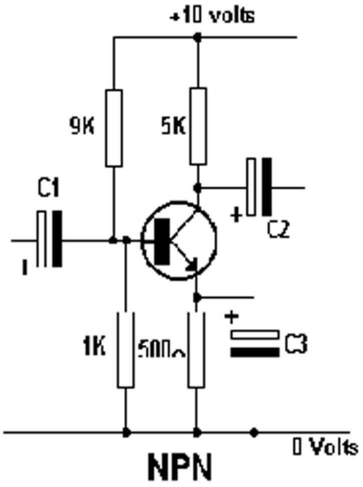
THE LOAD RESISTOR مقاومة الحمل



R1 and R2 bias the transistor in class A, so that a steady collector current flows. R3 is the load resistor. Look at the signal into C1.During the first half cycle it is positive, and increases the forward bias on the base of the transistor. This increases the base current and thereby the collector current through the load resistor. Therefore the voltage across the load increases, and the collector voltage, with respect to the zero line, decreases. The collector voltage falls as the base voltage rises. During the second half cycle, the input signal goes negative, reducing the forward bias on the base. This reduces both base and collector currents. The voltage across the load resistor falls and the voltage on the collector rises. Again, the collector voltage has done the opposite of the base voltage. The transistor inverts the input signal as well as amplifying it.

عند دخول التيار المتردد عند المكثف C1 الذي يمنع التيار المستمر ويمرر التيار المتردد فأنة في النصف الموجب من الإشارة يزدد التوصيل الأمامي لقاعدة الترانزيستور ويزدد تيار القاعدة وبالتالي تيار المجمع والتيار المار في الحمل R3 ويزدد فرق الجهد علي طرفي الحمل R3 وعلي المجمع .و في النصف السالب للإشارة يقل الانحياز الأمامي لقاعدة الترانزيستور مما يقلل من تيار القاعدة و تيار المجمع ويقل فرق الجهد علي الحمل ويزدد علي المجمع علي عكس القاعدة ولذلك فان الترانزيستور يعكس ويكبر الإشارة .

TYPICAL CIRCUIT VOLTAGES



The base voltage Vb, is set by potential divider 9K and 1K = 1 volt (ignoring Ib)The emitter voltage Ve, is Vb - 0.6 = 0.4 volts. The emitter current is Ve / Re = 0.0008AThe voltage across the 5K load resistor is 5000 x .0008 = 4 volts Therefore the collector voltage is 10 volts - 4 volts = 6 volts The power dissipated by the transistor is the voltage across the transistor multiplied by the current through it. = 5.6 volts x 0.0008A = 0.00448 watts.

يتحدد الجهد عند قاعدة الترانزيستور عن طريق مقسم الجهد المقاومتان

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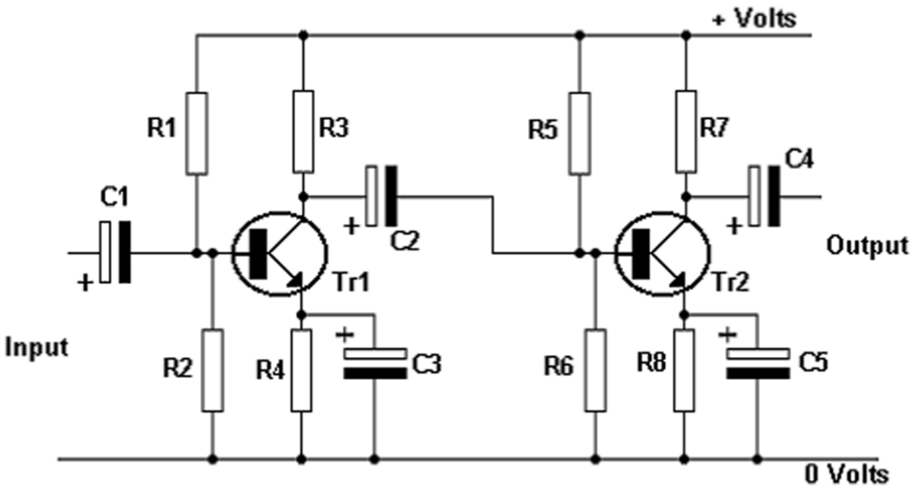
9k و 1k ويساوي ١ فولت (Vb=1V) وجهد المشع (Ve=Vb-0.6=0.4V) ولذلك يكون تيار المشع يساوي Ie=Ve/Re=0.0008 A ويكون الجهد على طرفي المقاومة 5K يساوي 0.0008 * 5000 أي 4V وبالتالي يكون جهد المجمع Vc=10V- 4V = 6V وتكون الطاقة المفقودة في الترانزيستور

Dissipated Power = (Vb + Ve +Vc) * Ie = 0 .00448 watts

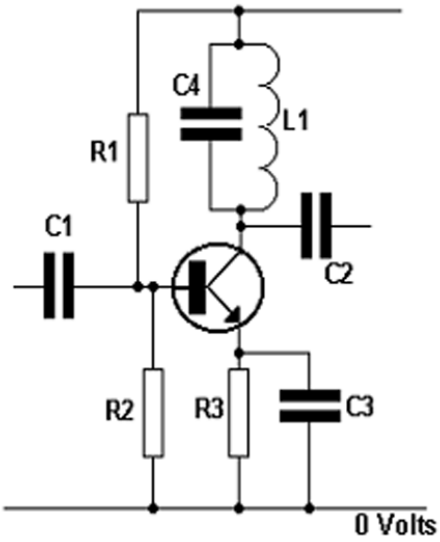
AMPLIFIERS IN CASCADE

عندما نريد معامل تكبير للإشارة اكبر من معامل التكبير لمكبر واحد يمكننا وضع اكثر من مكبر على التوالي ويكون التكبير النهائي هو حاصل ضرب معاملات التكبير لجميع المكبرات



If the gain of one stage of amplification is insufficient, then two or more stages can be connected in cascade, as shown. If the gain of each stage is 50 times, then the overall gain is 50 x 50 =2,500. If the input to Tr1 is 1 mV, then the output of Tr2 is 2,500 mV =2.5Volts.If the gain is excessive the circuit may be unstable, or the output may be clipped.

THE TUNED AMPLIFIER



عند استبدال مقاومة الحمل بدائرة رنين فأنة عند تردد الرنين تكون مقاومة دائرة الرنين عالية وعند الترددات الأخرى تكون منخفضة. ولذلك فأنة سيتم تكبير الإشارة فقط عند ترددات الرنين.

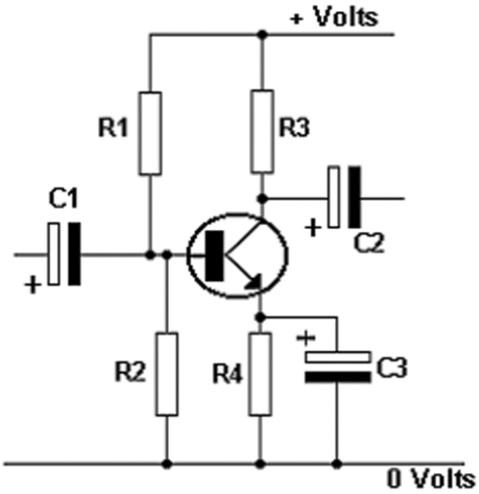
**Here the load resistor has been replaced by a tuned circuit, C4 and L1.
At resonance, the tuned circuit is high impedance.
At all other frequencies it is a low impedance.
Therefore only signals at the resonant frequency will be amplified**

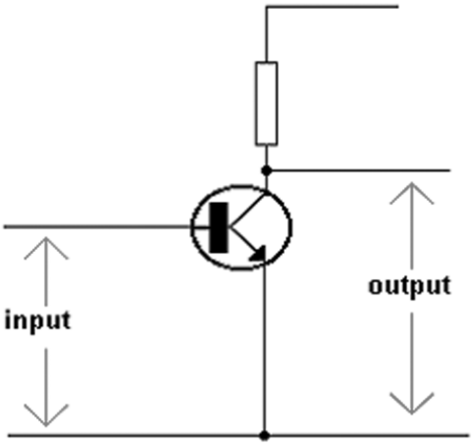
Since the tuned amplifier works at radio frequencies the capacitors can be much smaller in value than those used at audio frequencies

THE COMMON EMITTER AMPLIFIER

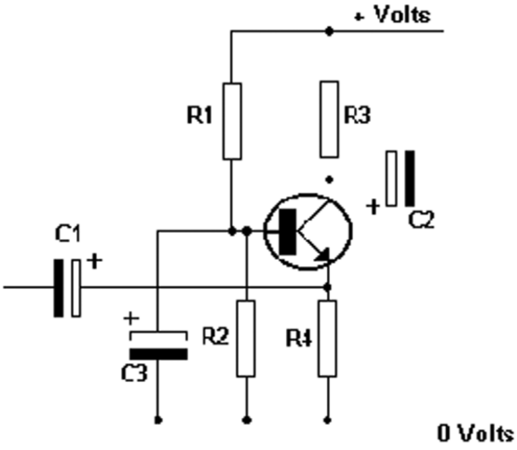
Sometimes called the grounded emitter, since the emitter capacitor connects the emitter to ground at ac frequencies. Since, as far as ac is concerned, the emitter is joined to ground, both input and output are connected to the emitter. Current gain is Ic/Ib and can be quite high, typically 50. Voltage gain is high, typically 250 Input impedance is medium, say 5K. Output impedance is medium, say 20k.The output is inverted with respect to the input. Its most common application is as a voltage amplifier.

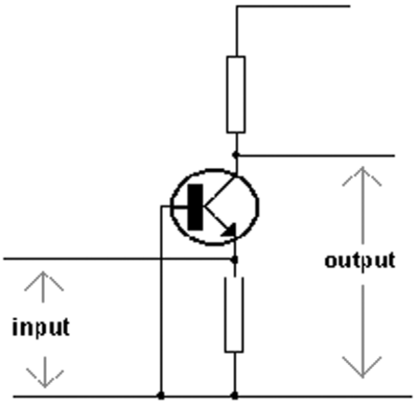
حيث يكون المشع متصل بالأرضي ويكون معامل تكبير الفولت كبير يصل إلى ٥٠ .





THE COMMON BASE AMPLIFIER





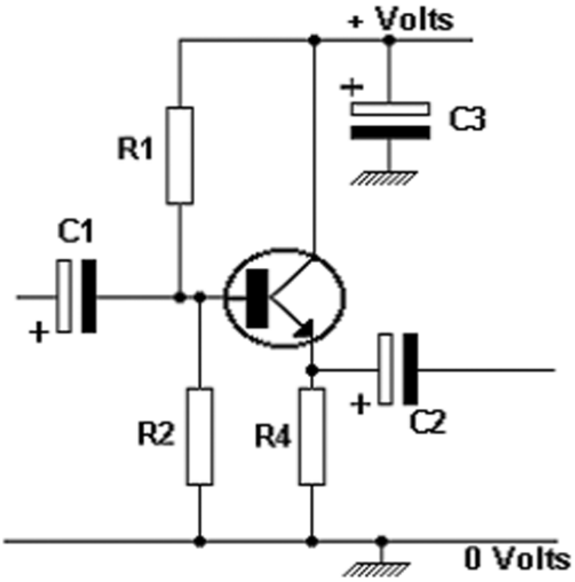
C3 connects the base to ground as far as ac is concerned. Therefore both input and output are connected to the base. (common base amplifier). Current gain is Ic / Ie which is less than 1. The voltage gain is high since it is Rc / Re. (Approximately the same current flows through them). It is typically 250.The input impedance is low, typically 20 ohms. The output impedance is high, typically 1Megohm.The output signal is not inverted with respect the input. It is often used to match low impedance devices to high impedance ones. It is commonly used at VHF

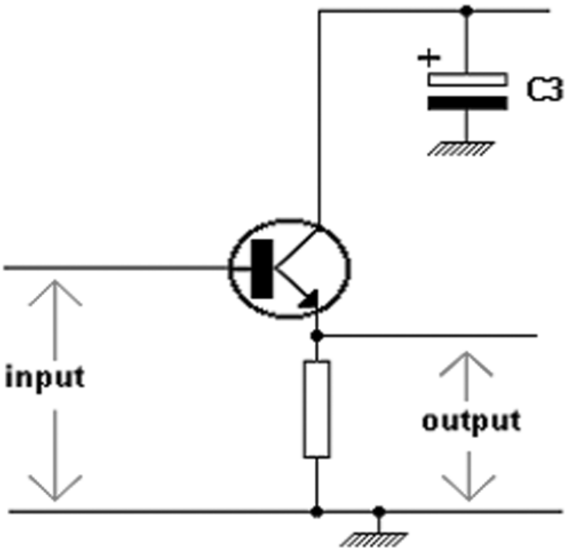
حيث توصل القاعدة بالأرضي وتستخدم لمواءمة الأجهزة التي لها مقاومة علية مع الأجهزة التي لها مقاومة منخفضة.

THE COMMON COLLECTOR AMPLIFIER

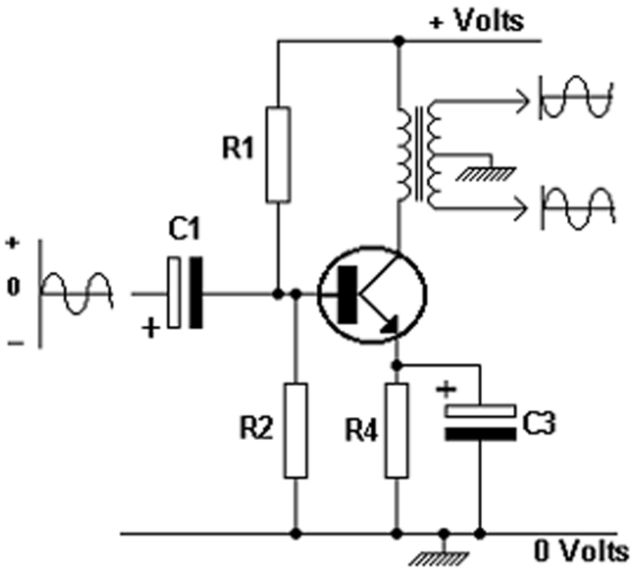
The positive power supply rail is joined to the zero volts rail by C3. As far as ac is concerned, both rails are joined together. Therefore they, and the collector, are common to both input and output. Since the emitter voltage follows the base voltage, it is also called the emitter follower. Current gain is Ie/Ib which is quite high, typically 50. Voltage gain is only 1 because of the undecoupled emitter. The input impedance is high, typically 500k, requiring only low power to drive it. The output impedance is low, typically 20 ohms. The output signal follows the input. There is no inversion. It is often used to match high impedances to low ones. It can be used to drive several high impedance loads.

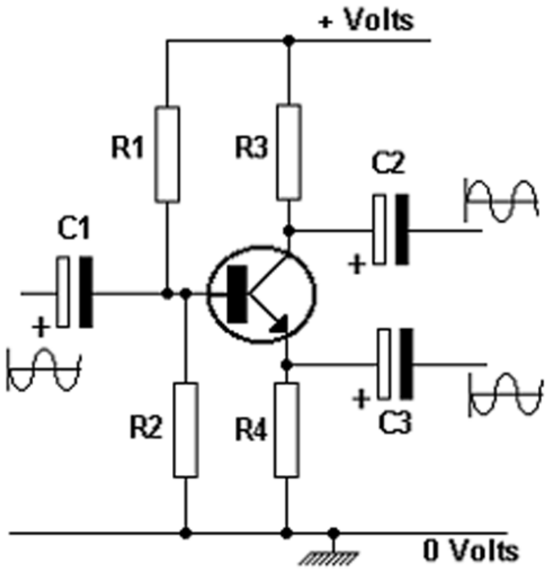
حيث يوصل المجمع بالأرضي ويعطي تكبير كبير للتيار يصل إلى ٥٠.





THE PHASE SPLITTER





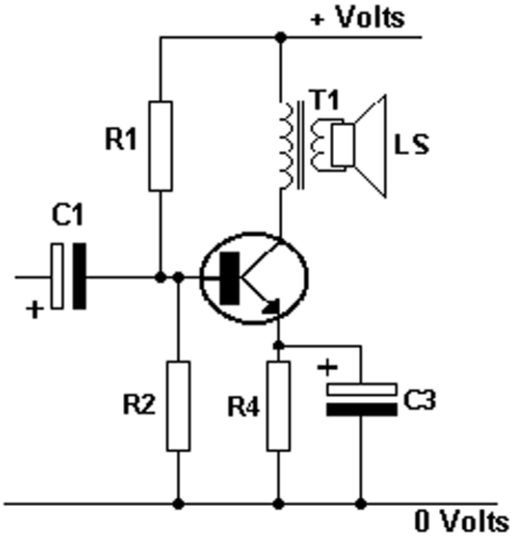
The phase splitter has one input and two outputs. The two outputs are inverted with respect to each other. That is, as one increases in a positive direction the other increases in a negative direction. In the first diagram the phase splitting is done by the transformer. In the second diagram, the output from the collector is an inverted version of the input. The output from the emitter follows the input. There is no amplification from this circuit because the emitter is undecoupled. The word PHASE indicates a shift in time. In actual fact there is no phase change here, only inversion of the signal.

في هذه الدائرة يوجد دخل واحد وخرجين متعاكسان في الطور و هذا الاختلاف في الطور ناتج من المحول . الخرج عند المجمع يكون معاكس للدخل في الطور وعند المشع يكون في نفس الطور .

THE CLASS A POWER AMPLIFIER

من عيوب مكبر القدرة في هذه الدائرة أن تيار المجمع يكون له قيمة كبيرة حتى إذا لم يكون هناك إشارة دخل .

The transistor is biased in class A which means that collector current flows all the time.. The collector current can increase or decrease. The input signal increases and decreases the forward bias causing the collector current to change. These changes in current in the primary of the transformer induce signal currents in the secondary.



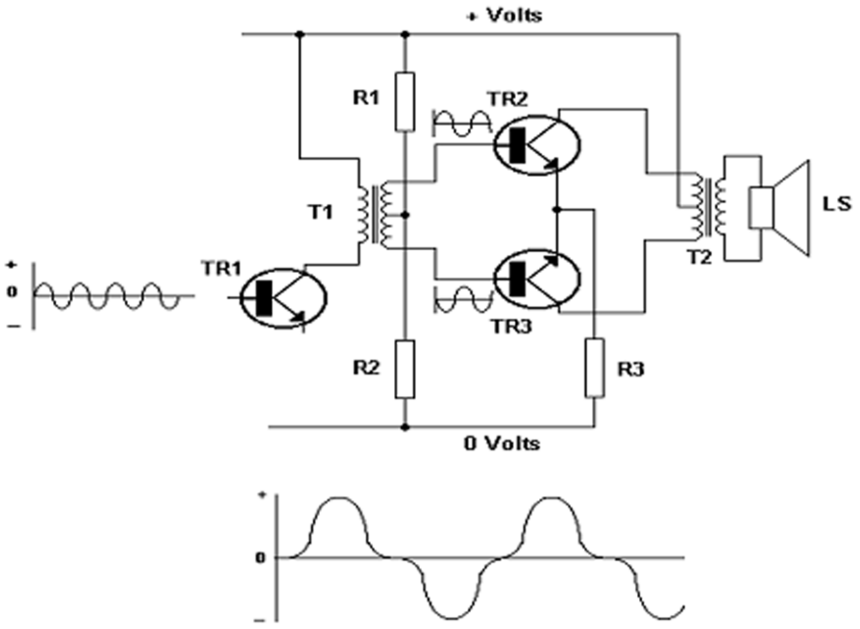
The transformer matches the output impedance of the transistor to the loudspeaker impedance. The disadvantage of this circuit is that the collector current is high even if there is no signal input.

Class B push-pull is more efficient.

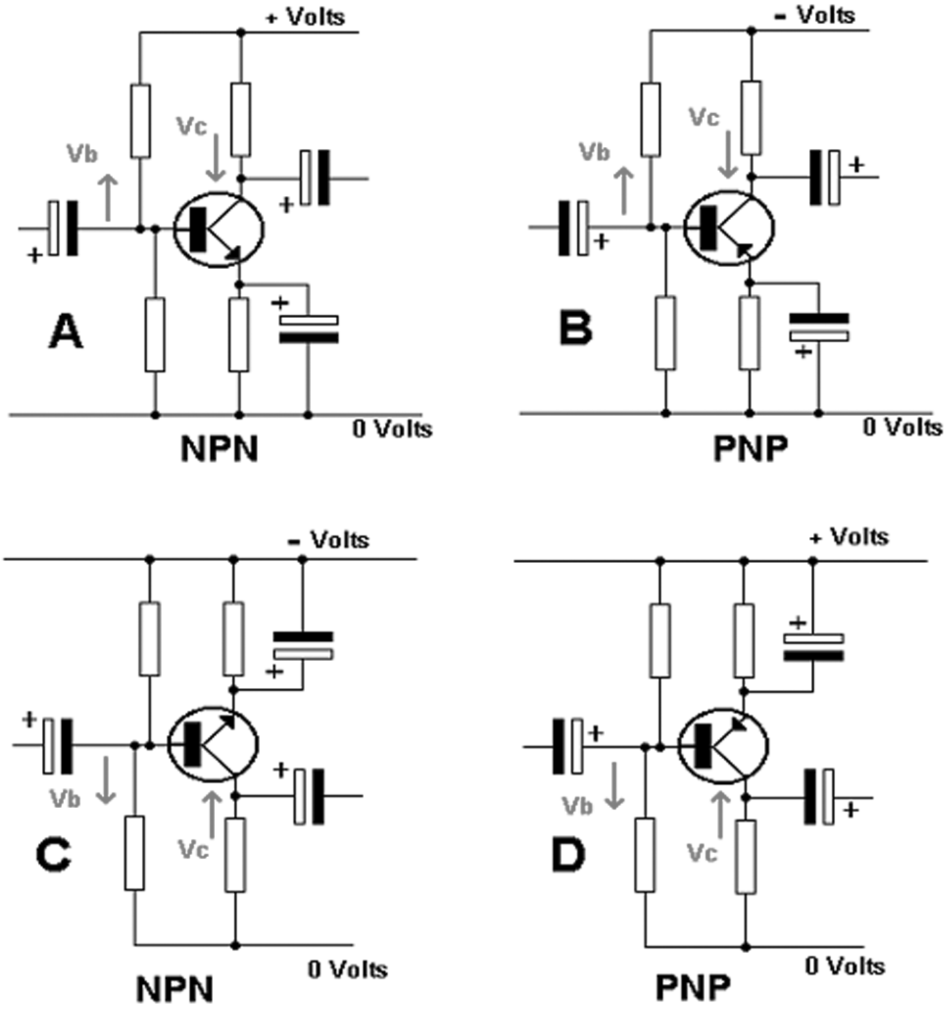
THE PUSH PULL POWER AMPLIFIER

ميزة هذه الدائرة أنة لا يوجد تيار في الخرج إذا لم يكن هناك تيار إشارة دخل .

TR2 and TR3 are biased in class B, which means that they are normally non conducting when there is no signal input. TR1 and T1 form a phase splitter, opposite polarity signals appearing at the ends of T1 secondary. When there is a signal in ,TR2 conducts on the positive half of the waveform only and TR3 conducts on the negative half. Current flows down through the top half of T2 primary when TR2 conducts, and up through the bottom half when TR3 conducts. Both halves are combined in the secondary of T2 to produce an amplified version of the input. R1 and R2 apply a small forward bias to avoid crossover distortion, which is shown in the lower waveform. This distortion is caused by the non-linear characteristics of the emitter/base junction. (for more details see the junction diode Vb/Ib curves). The advantage of this circuit is that there is very little current taken if there is no signal input.



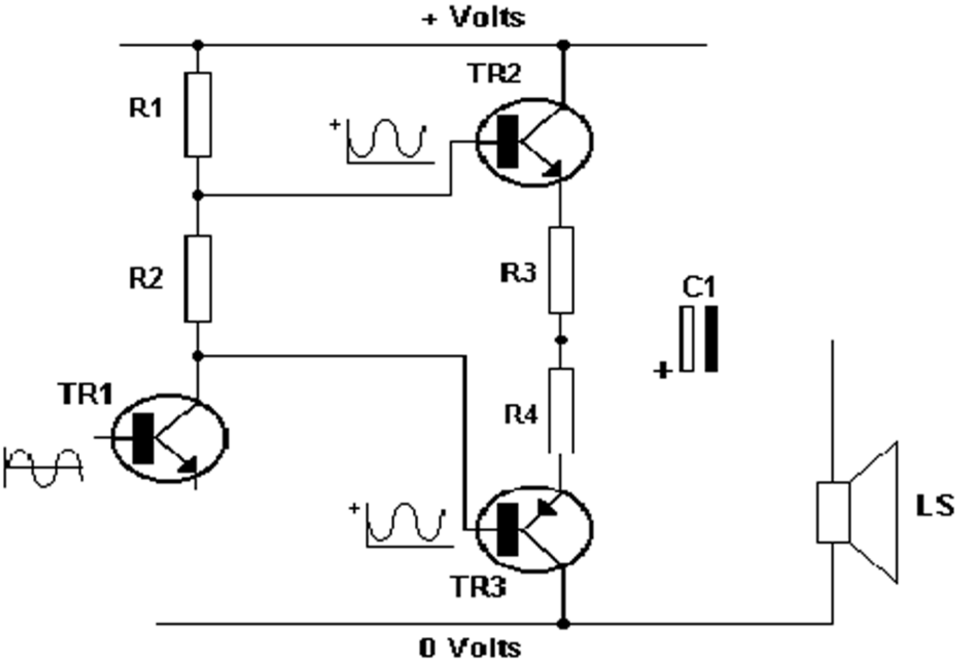
THE COMPLEMENTARY PUSH-PULL AMPLIFIER PART 1



It is sometimes difficult to understand the behavior of a circuit when the transistors are drawn upside down. In diagram A, as the base voltage goes towards the + rail (goes more positive), the collector voltage goes away from the + rail (goes less positive). In diagram B, as the base voltage goes towards the - rail (goes more negative), the collector voltage goes away from the - rail (goes less negative). In diagram C, as the base voltage goes away from - rail (goes more positive), the collector voltage goes towards the - rail (goes less positive). In diagram D, as the base voltage goes away from + rail (goes more negative), the collector voltage goes towards the + rail (goes less negative).

THE COMPLEMENTARY PUSH PULL AMPLIFIER PART 2

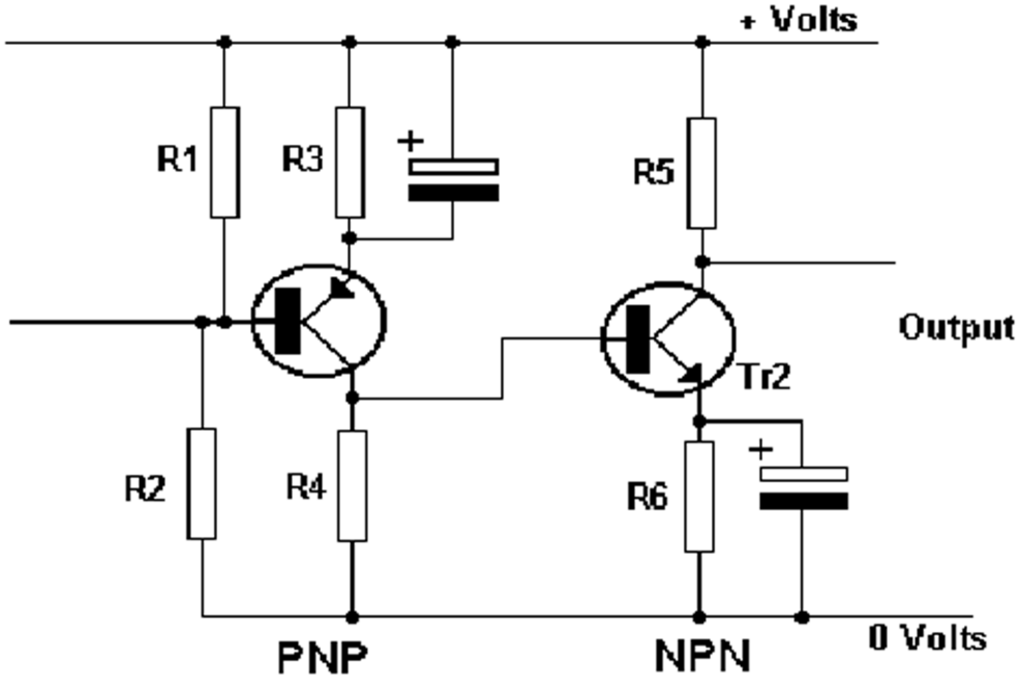
TR2 and TR3 are complementary. They have the same characteristics but one is NPN and the other PNP. The NPN has + on its collector and less positive on its emitter. The PNP Has + on its emitter and zero on its collector. Therefore both have correct polarity voltages. The voltage at the junction of R3 and R4 is half the supply voltage. If R2 is replaced by a wire link, and R1 selected to give half the supply volts at TR1 and TR2 bases then they would both be biased in class B, and both would be non conducting. Look at the waveforms on the bases of the output pair. During the first half cycle the signal is going less positive. This is reversing biasing the NPN transistor and increasing forward bias on the PNP transistor. This means that the NPN remains cut off and the PNP conducts during this first half cycle. In the next half cycle the signal on the bases is now increasing in a more positive direction. During this half cycle the NPN conducts while the PNP is cutoff. So the NPN is off and the PNP is on during the first half cycle, and current flows through the loudspeaker as C1 charges. The NPN is on and the PNP off during the second half cycle, and current flows the other way through the loudspeaker, as C1 discharges. R2 is added to give a small forward bias to both transistors thereby avoiding crossover distortion. (see the page on push-pull power amplifiers).



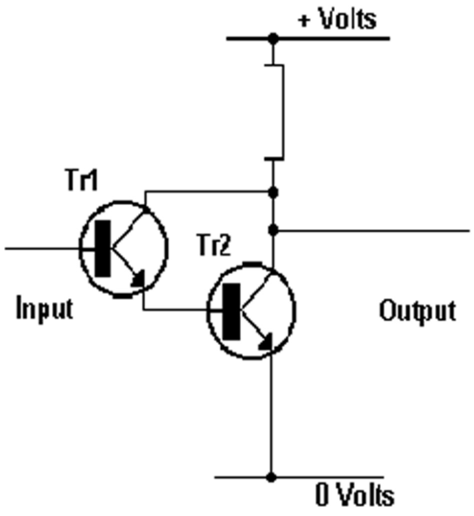
THE DIRECTLY COUPLED AMPLIFIER

قاعدة الترانزيستور ال **NPN** متصلة مباشرة بمجمع الترانزيستور ال **PNP** ولهذا فأنة لا يحتاج مقاومات انحياز لضبط جهد الانحياز له . وسوف تقوم الدائرة بتكبير إشارات التيار المستمر و التيار المتردد و هذا لعدم وجود مكثف الازدواج الذي يمنع التيار المستمر .

The PNP transistor is upside down with respect the NPN transistor and thus has the correct operating voltages. If the circuit is designed so that the PNP collector voltage is a suitable value for the NPN transistor base, then there is no need for bias resistors for the NPN transistor. The circuit will amplify dc signals as well as ac ones. This is because there is no coupling capacitor to block dc. It will also amplify very low ac frequencies because there is no capacitive reactance to oppose them. However, if temperature changes cause dc drift in the first transistor, then these will be amplified by the second transistor and change its normal operating voltages. This is usually prevented by some form of dc stabilization.



THE DARLINGTON PAIR ثنائية دارلنجتون



يكون تيار المشع للترانزيستور الأول هو تيار القاعدة للترانزيستور الثاني وبذلك يكون معامل التكبير ١٠٠٠٠.

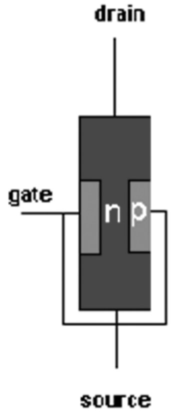
The emitter current of Tr1 is the base current of Tr2. A change in base current of Tr1 can give a change 100 times larger in its emitter current. A change in the base current of Tr2 has a similar effect on its emitter current. Therefore there is an overall amplification of 100 x 100 = 10000 times. This circuit is sometimes called the Super Alpha Pair. It is often used as a power output stage. The two transistors can come in the same package.

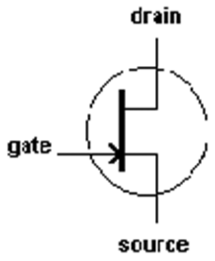
FIELD EFFECT TRANSISTORS ترانزيستور تأثير المجال

THE JUNCTION FIELD EFFECT TRANSISTOR

يقوم ترانزيستور تأثير المجال بتمرير التيار من المصدر **source** إلى المصرف **drain** عندما يكون الجهد المطبق على ال **drain** أعلى من الجهد المطبق على ال **source** . عندما تكون البوابة **gate** سالبة بالنسبة لل **source** ينشأ مجال الكتروستاتيكي يقلل التيار المار من ال **source** الى ال **drain** وإذا كانت اكثر سالبيه فسوف تمنع مرور التيار تماما. وعلى هذا فأنة يتم التحكم في ترانزيستور تأثير المجال **FET** بفرق الجهد بينما يتم التحكم في ترانزيستور الوصلة بالتيار .

The field effect transistor (FET) is made of a bar of N type material called the SUBSTRATE with a P type junction (the gate) diffused into it..
With a positive voltage on the drain, with respect to the source, electron current flows from source to drain through the CHANNEL.
If the gate is made negative with respect to the source, an electrostatic field is created, which squeezes the channel and reduces the current. If the gate voltage is high enough the channel will be "pinched off" and the current will be zero.

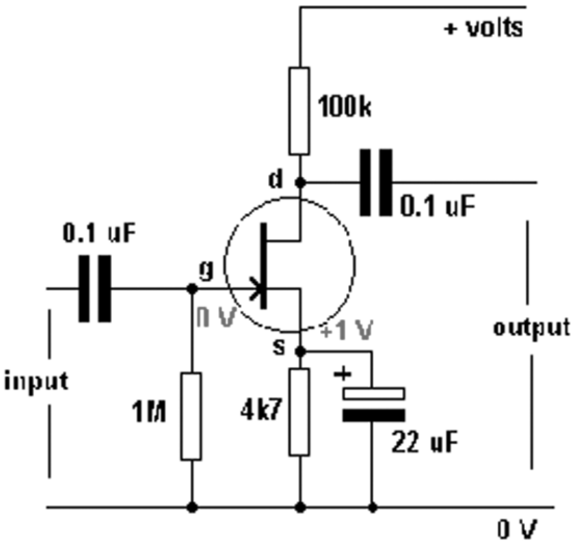




N-channel FET

The fet is voltage controlled, unlike the transistor which is current controlled. This device is sometimes called the junction fet or jugfet or jfet. If the fet is accidentally forward biased, gate current will flow and the fet will be destroyed. To avoid this, an extremely thin insulating layer of silicon oxide is placed between the gate and the channel.
The device is then known as an insulated gate fet, or igfet or metal oxide semiconductor fet (mosfet)

THE FET AMPLIFIER



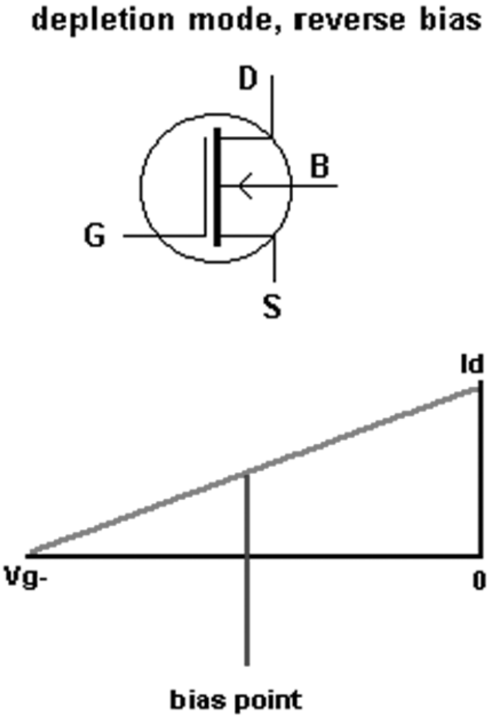
To correctly bias the fet, the gate needs to be negative with respect to the source. Bias is obtained in the following manner. Drain current flows through the source resistor and develops a voltage across it, making the emitter positive with respect the zero volts rail. There is no gate current, so there is no current through the gate resistor. This means that there is no voltage across this resistor, so it will be zero volts at both ends. This means that there is zero volts on the gate . Therefore the source is positive with respect to the gate. The gate is negative with respect to the source. The fet is biased correctly. When a signal voltage is applied to the gate, it controls the drain current.

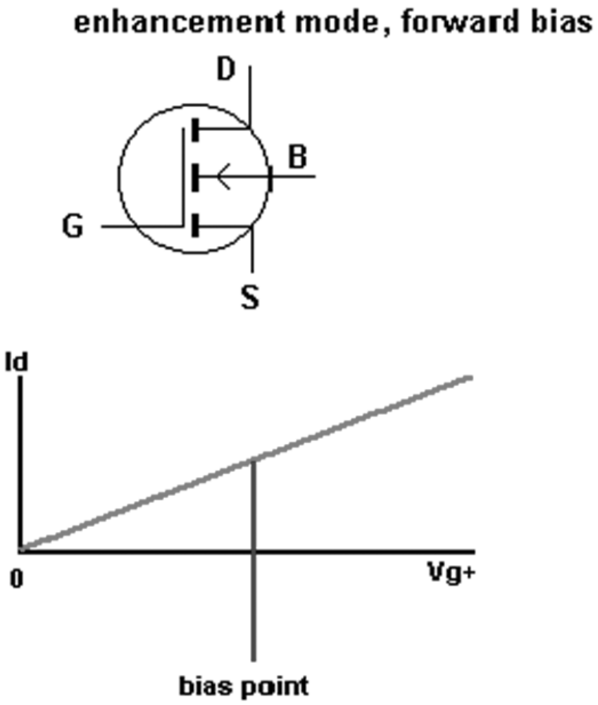
When the signal goes more negative (less positive) the drain current is reduced and the voltage across the drain resistor is less. The drain voltage goes more positive. When the signal goes less negative (more positive) the drain current is increased and the voltage across the drain resistor is more. The drain voltage goes less positive. In both cases the drain voltage does the opposite of the gate voltage.

THE METAL OXIDE SEMICONDUCTOR FET (MOSFET)

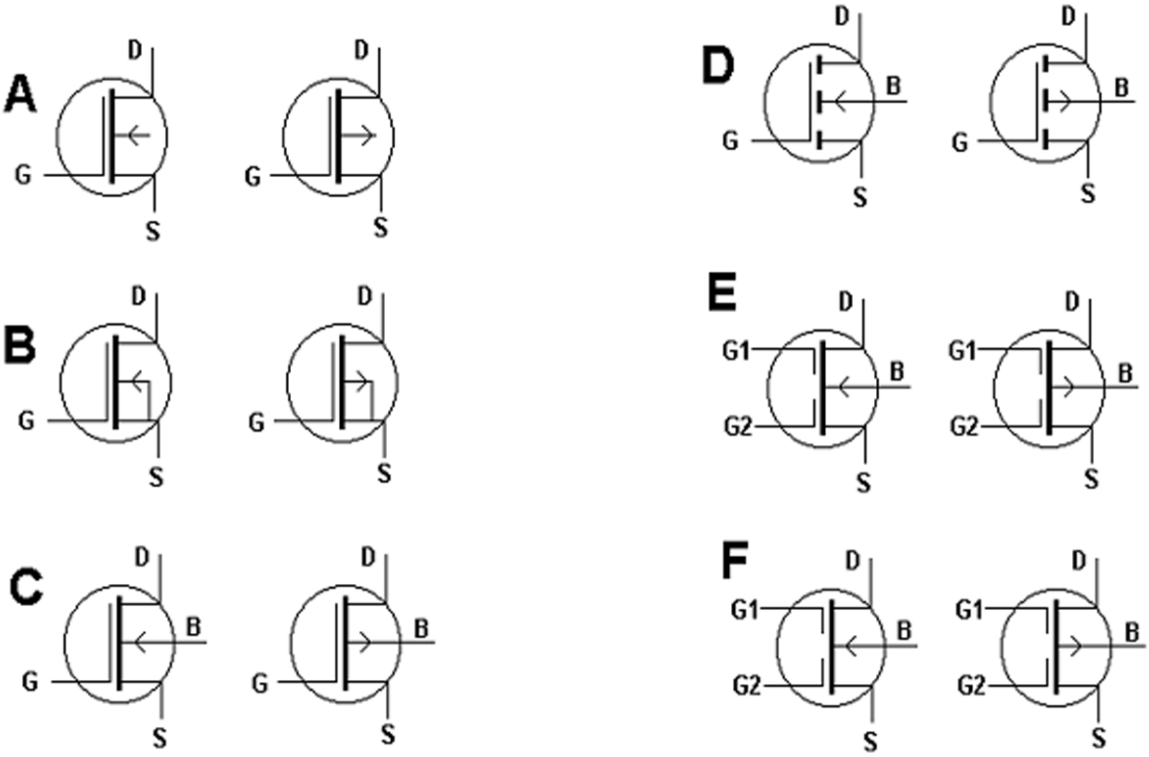
من عيوب ال FET ترانزيستور أنة إذا قمنا بتطبيق فرق جهد علية بصورة مفاجئة فأن التيار المفاجئ سوف يمر خلال ال gate ويدمر الترانزيستور و لتجنب ذلك توضع طبقة رقيقة جدا من أكسيد السيليكون بين ال gate وال channel وهذا ما يسمى ال MOSFT TRANSISTOR .

The mosfet has the gate insulated from the substrate by a thin layer of silicon oxide, to prevent gate current flowing and damaging the device (see the page on fets). There are two main families. Enhancement - where the mosfet has to be forward biased like a transistor. Depletion - where the mosfet is reverse biased like a thermionic valve (tube in the USA). Some mosfets have two gates (dual gate mosfets) and are commonly used as r.f. mixers. The insulating layer is extremely thin and can be easily damaged by static. Antistatic precautions must be taken when handling them. Soldering iron tips must be earthed. The operator must be grounded via a high value resistor, with wriststraps etc. The workplace must be grounded safely. Components must be handled with care. I usually touch some earthed point just before handling static sensitive devices. Some devices have Zener diodes built in, between gate and source, for protection.



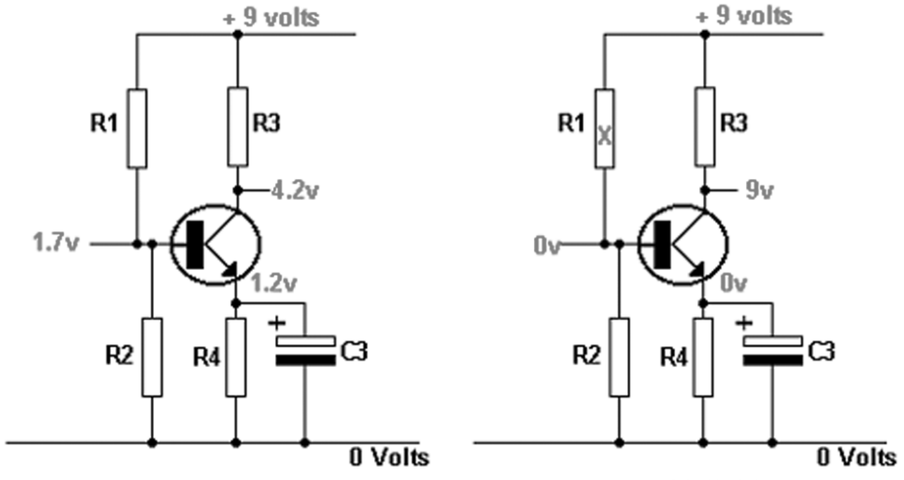


MOSFET CIRCUIT SYMBOLS



TRANSISTOR FAULT FINDING كيفية معرفة عيوب الترانزيستور

BASE BIAS RESISTOR 1 OPEN CIRCUIT إذا كانت المقاومة الأولى لانحياز قاعدة الترانزيستور تالفة



OK FAULTY

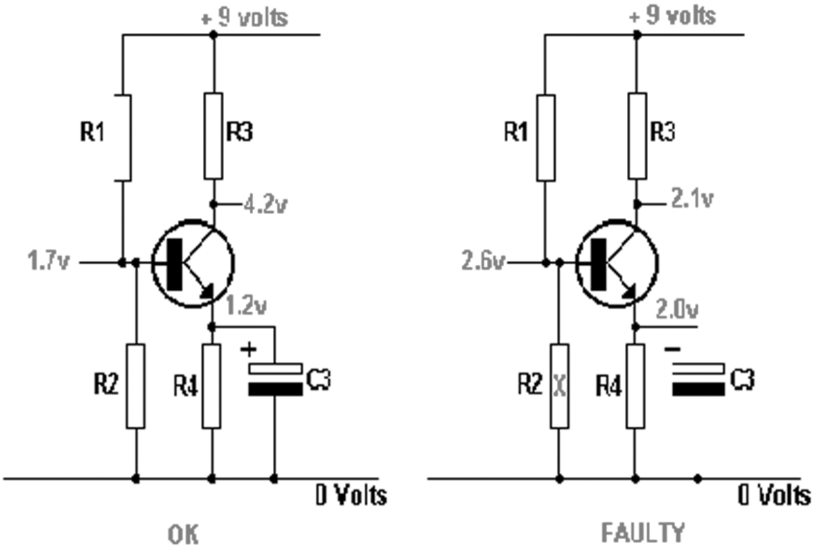
All voltages are measured with respect to the zero volts rail.

في هذه الحالة لا يكون هناك إي جهد أو تيار لقاعدة الترانزيستور ويكون جهد المجمع هو نفس جهد المصدر ولا يمر تيار خلال المقاومة R4 وبالتالي لا يكون هناك فرق جهد بين طرفيها ويكون الجهد عند طرفيها صفر.

With R1 o/c there is no voltage on the base, no base bias and no base current. The transistor is OFF and there is no collector current and no voltage drop across R3. The collector voltage will be the same as the supply volts, +9. There

is no current through R4, so there is no voltage drop across it. The voltage at both ends is the same, zero volts.

BASE BIAS RESISTOR 2 OPEN CIRCUIT إذا كانت المقاومة الثانية لانحياز الترانزيستور تالفة



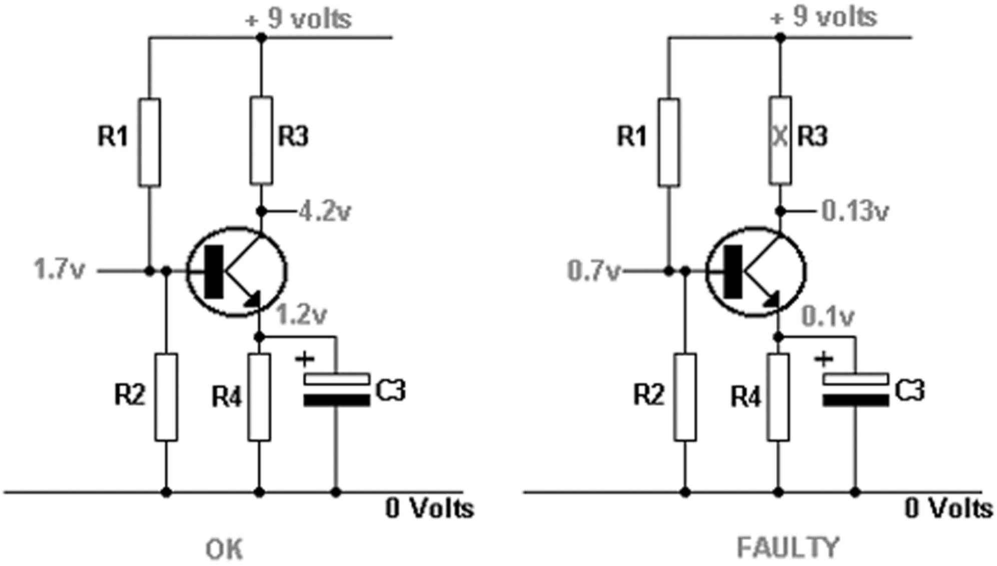
OK FAULTY

All voltages are measured with respect to the zero volts rail.

في هذه الحالة لا يكون هناك تقسيم للجهد الداخل إلى القاعدة وبالتالي يكون جهد المصدر هو جهد القاعدة مما يتسبب في زيادة تيار القاعدة و بالتالي في التيار المار إلى المجمع وينخفض جهد المجمع ويزداد جهد المشع.

There is no potential divider action and the full +9 volts is applied to the base by R1. This causes a high base current to flow, which in turn causes a high collector current to flow. There is a large volts drop across R3, causing a low collector volts. There is a large volts drop across R4, causing the emitter volts to rise.

COLLECTOR LOAD RESISTOR OPEN CIRCUIT إذا كانت مقاومة الحمل تالفة



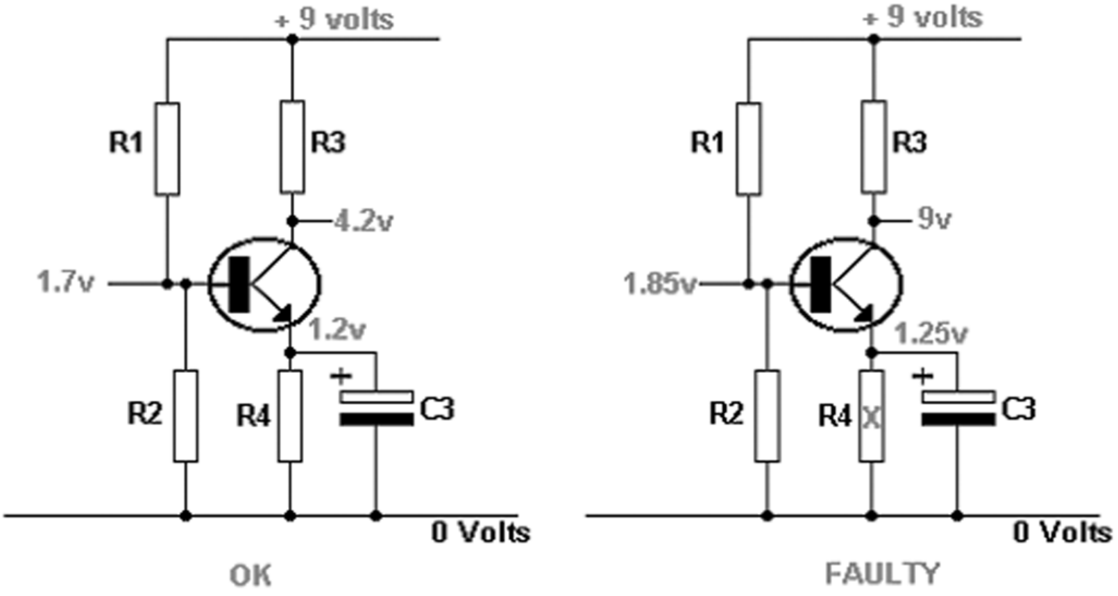
OK FAULTY

All voltages are measured with respect to the zero volts rail.

في هذه الحالة تكون القاعدة في وضع التوصيل الأمامي لذلك يمر تيار القاعدة ويكون أعلى من الطبيعي لان كل تيار المشع يمر إلى القاعدة ولا يمر إلى المجمع ويكون التيار خلال المقاومة R1 مرتفع لذلك يكون فرق الجهد بين طرفيها كبير ويكون جهد القاعدة صغير ولان جهد المجمع دائما يكون أقل من القاعدة فيكون جهد المجمع تقريبا صفر .

The base is still forward biased, so base current flows. The base current will be higher than normal, because all the emitter current goes to the base and none to the collector. Since there is more current through R1, there will be a higher voltage drop across it, and the base voltage will be lower. Since the emitter voltage is always about 0.6 volts lower than the base, it will read 0.1 volts. We would expect the collector voltage to read zero, but we are actually reading the base voltage via the base/collector junction and it will read about 0.6 volts lower than the base.

EMITTER RESISTOR OPEN CIRCUIT مقاومة المشع تالفة



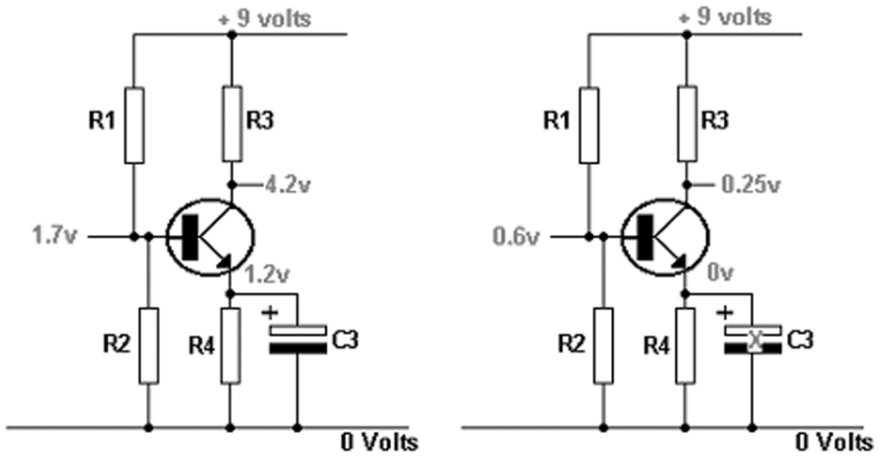
All voltages are measured with respect to the zero volts rail.

في هذه الحالة لن يكون هناك تيار مار إلى القاعدة أو المجمع ويكون جهد القاعدة أعلى من الطبيعي و جهد المجمع هو نفس جهد مصدر الجهد .

There can be no base or collector current. Since the current through R1 is less than normal, there will be a lower voltage drop across it and the base voltage will be higher than normal. Since there is no current through R3 there will be no voltage dropped across it. The voltage will be the same at both ends, and the collector will be at the supply voltage. We would expect there to be no voltage across R4, but the meter connects the emitter to zero volts and some current flows through the meter. The voltage indicated would depend upon the type of meter.

EMITTER CAPACITOR SHORT CIRCUIT

في هذه الحالة يكون المشع متصل بالأرضي ولهذا يكون هناك زيادة في الانحياز الأمامي لوصلة المشع/القاعدة ويكون هناك زيادة في تيار القاعدة والمجمع وزيادة في التيار المار في المقاومة R1 وبالتالي زيادة في فرق الجهد بين طرفيها ويقل جهد القاعدة وأيضا يكون هناك فرق جهد كبير على المقاومة R3 ويكون جهد المجمع اقل من الطبيعي وجهد المشع يكون صفر تقريبا.



OK

FAULTY

All voltages are measured with respect to the zero volts rail.

The emitter is connected to zero volts and there is an increased emitter/base forward bias. Base and collector currents increase. There is more current through R1, a higher voltage drop across it, and a lower base voltage. Since the collector current is higher there will be a larger voltage drop across R3. The collector voltage will be lower than normal. The emitter voltage will of course be zero. If the capacitor goes open circuit, the dc voltages will remain at their normal values. However, the gain will be much reduced.

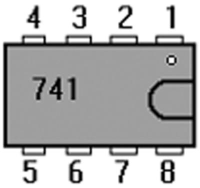
Integrated circuits : الدوائر المتكاملة

الدائر المتكاملة غالبا ما يطلق عليها CHIPS ولها أشكال وأحجام كثيرة لعل أكثرها شيوعا ٨ و ١٤ و ١٦ رجل(بن) وتكون موضوعه على صفين ويمكن أن نقوم بتركيب الدوائر المتكاملة مباشرة على اللوحة المطبوعة أو على قاعدة . بعض الدوائر المتكاملة قد تتلف من الشحنة الكهروستاتيكية التي تحملها أجسامنا ولذلك لابد من تخزينها بصورة صحيحة وأن نقوم بلمس أي مادة معدنية متصلة بالأرضي قبل استخدام الدوائر المتكاملة.

عند لحام الدوائر المتكاملة على اللوحة المطبوعة قم بلحام الطرفين الأول والأخير للدائرة المتكاملة ثم تأكد من أنها مستوية تماما على اللوحة المطبوعة فأن لم تكن كذلك قم بفك الطرفين وأجعلها مستوية وقم بلحام الطرفين مرة اخرى وتأكد من أن الدائرة مستوية تماما على اللوحة المطبوعة ثم قم بلحام باقي الأطراف .

**IC's, often called "chips", come in several shapes and sizes.
Most common are 8, 14, or 16 pin dual in line (dil) chips.
IC's can be soldered directly into printed circuit boards, or may plug into sockets which have already been soldered into the board.
When soldering, ensure that the IC (or the socket) is the correct way round and that no pins have been bent underneath the body.
When fitting new IC's it is often necessary to bend the pins in slightly, in order to fit it into the board (or socket).
Some IC's are damaged by the static electricity which most people carry on their bodies. They should be stored in conductive foam or wrapped in tin foil. When handling them, discharge yourself periodically by touching some metalwork which is earthed, such as a radiator.
Solder two diagonally opposite pins (say pin 1 and pin 5 in the diagram below) and check that the IC is flat on the board before soldering the rest. If it is not flat then reflow the solder on the two pins pushing the IC flat. When satisfied, solder the remaining pins.**

Take when removing faulty IC's from pcb's. You may damage a 100 pound board when carelessly removing a 20p IC.



view from component side of pcb

The most common IC s أشهر الدوائر المتكاملة

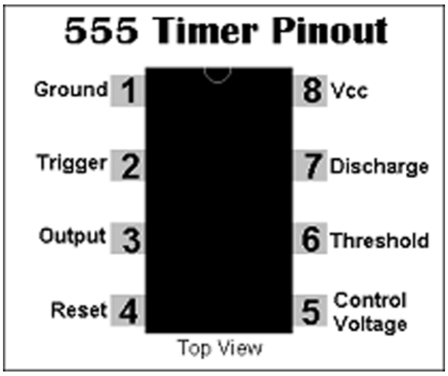
555 IC

عند بداية التعامل مع الدوائر الإلكترونية فأننا نبحث عن مشاريع صغيرة وبسيطة يمكن لنا أن نقوم بعملها بسهولة فأننا نجد أن معظم هذه المشاريع يحتوي على 555 IC وسوف نقدم تحليل لهذه الدائرة المتكاملة والتي لها الكثير من التطبيقات .

When I was first discovering electronics I would search for any simple project I could get my hands on. Most of them involved making use of a 555 timer. What is this IC you may ask?

The following sections offer a brief introduction to one of the most used IC ever produced, the 555 Timer. The applications of this IC are endless. A few examples are: timing events, synchronizing signals and as triggers in general. They are used in anything from intermittent windshield washers to electronic ignitions. They can be found in toys as well as medical equipment. It is to your advantage to learn the basic configurations used

HERE IS THE PINOUT OF A 555 CHIP: ترتيب أطراف ال ٥٥٥



(Note: A 7555 is the CMOS version of the 555 and uses a fraction of the 555's power. Pinouts are the same.)

لاحظ أن ال 7555 IC هي ال CMOS 555 ولها نفس ترتيب الأطراف

MULTIVIBRATOR استخدام ال ٥٥٥ كمذبذب

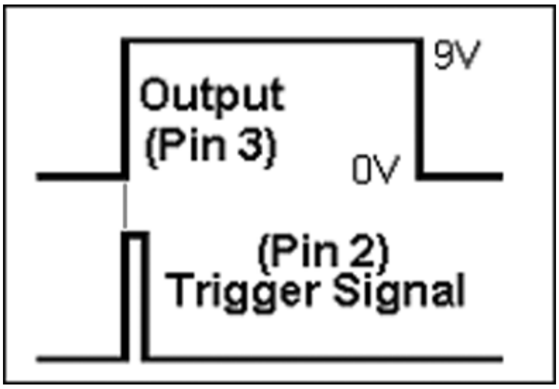
توصف ال٥٥٥ كمذبذب بإضافة القليل من المكونات الإلكترونية إلى أطرافها والمذبذب يتغير من حالة إلى أخرى مع مرور الوقت في هذه الحالة تقوم الدائرة بإنتاج موجة مربعة square wave .

555s are configured as a multi-vibrator by adding a few components to the pins. This is a circuit that oscillates from one state to another over time, in this case, creating a square wave. There are two basic forms of timers, both being multivibrators.

مذبذب احادي الاستقرارMonostable Multivibrator:

هذه الدائرة يكون لها خرج ثابت يظل على حالته إلى أن تأتى له إشارة من الميقاتي (Timer) فيغير من حالته.

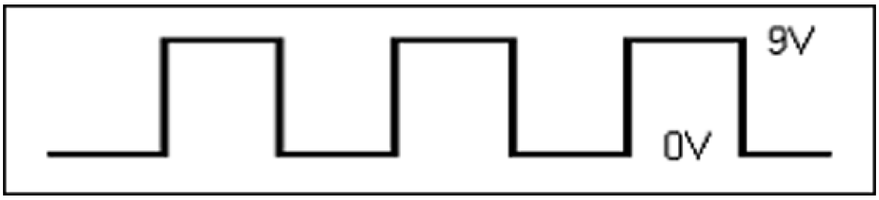
A monostable multivibrator circuit has an output that stays in a given state (say +9V) until a separate signal triggers the timer. The state of the output is then shifted to 0V and will remain in that state until a pre- determined time is reached. The output then goes back to +9Vs, waiting for a new trigger signal to come in. See the figure to the left for a graphical representation of this. This circuit is also called a ONE-SHOT or PULSE-STRETCHER.



The timer the output changes states for is determined by a Resistor/Capacitor combination that will be described in the Monostable section of this book.

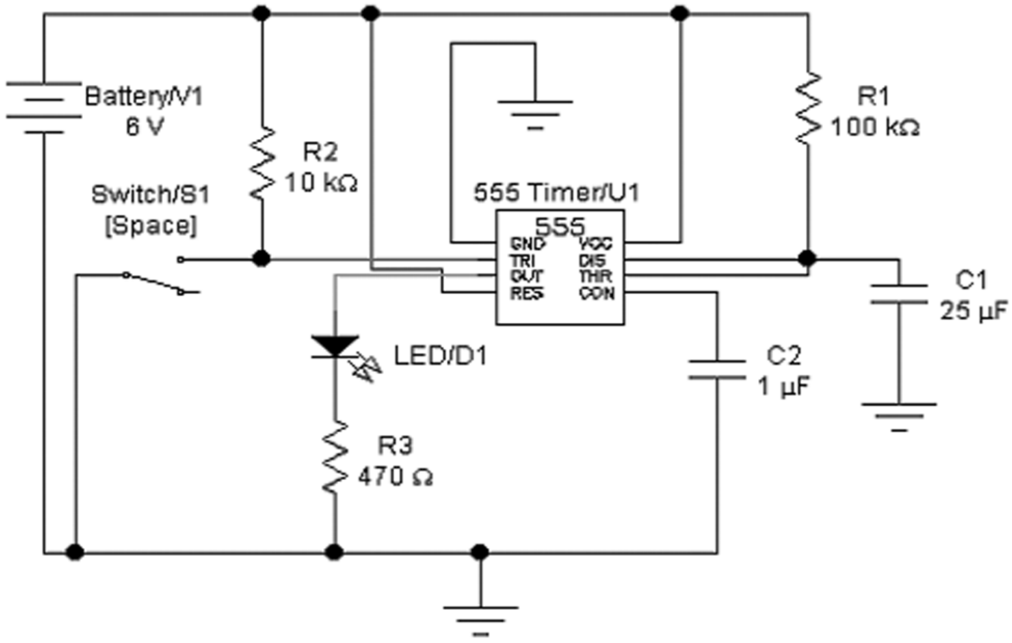
Astable Multivibrator:

An Astable Mulivibrator spontaneously switches from one state to another (say +9V to 0V to +9V...). The time it stays high and the time it stays low is determined by the values of the external components. This will be described in the section of this site.



555 Timers: Monostable

Monostable multivibrators can be configured in many ways. The following is a one-shot timer hooked to an LED. When the switch is flipped on then off, a signal is sent to the trigger pin. The LED will light for 2 and 3/4 seconds before going out (timing-out).The blue line is the trigger signal (positive 6V to 0V when switched) and the red line is the output.



Description of Circuit:

هذه الدائرة تتطلب مكونات إلكترونية قليلة تضاف إلى ال٥٥٥ وهي R1 و C1 بصفة أساسية أما C2 فهو لمنع مشاكل عدم الاستقرار و R2 تستخدم للاحتفاظ بإشارة ال Trigger إلى أن يقوم المفتاح بتوصيلها إلى الأرضي و المقاومة R3 تحدد التيار المار إلى ال LED .

This circuit requires very few external components. The main two are R1 and C1. C2 is merely there to prevent instability problems. R2 is used to hold the trigger high until the switch brings it to ground (low). Note that the IC wants a negative going trigger. R3 limits current the LED. A 6V battery is shown but you can use anything from 4.5 to 12Volts. I use either a 9V Battery or an adaptor set to 6V. If you want to interface the timer to a TTL circuit you must match that voltage, typically +5V.

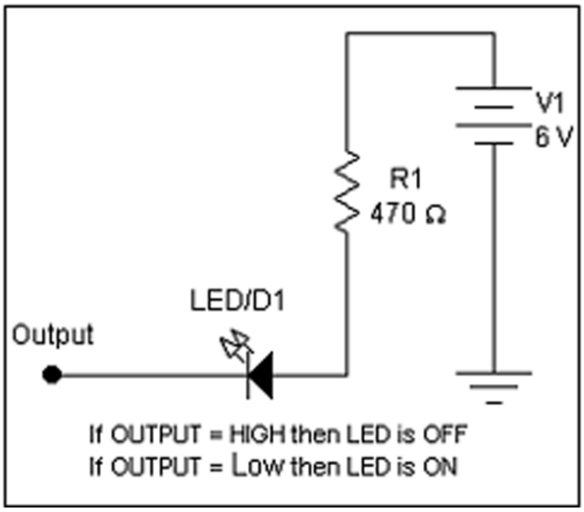
This is how the LED TIME-ON (TIME-OUT) is determined. Let's call this T. The formula to solve for this is:

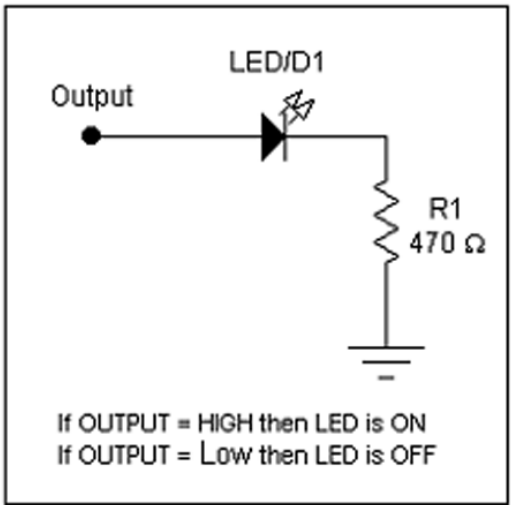
$$T = 1.1 \times R1 \times C1$$

In our circuit above R1 is 100,000 Ohms (100K) and the Capacitor is .000025 Farads (25 microfarads). Let's solve for T.

$$T = 1.1 \times 100{,}000 \times .000025$$
$$T = 2.75 \text{ Seconds}$$

Simple, huh? Now let's say you want the LED on for 1 Minute and 50 seconds? Try a 1M resistor and a 100uF Capacitor. Make sure while solving you convert the microfarads to Farads. Note that the output normally is low and goes high upon triggering. In the circuit above, the LED is wired to illuminate when the output goes high. If you want it to be normally on and off upon triggering, change the connection after R3 from the ground to the positive 6V side.


V1
6 V
R1
470 Ω
LED/D1
Output
If OUTPUT = HIGH then LED is OFF
If OUTPUT = Low then LED is ON


LED/D1
Output
R1
470 Ω
If OUTPUT = HIGH then LED is ON
If OUTPUT = Low then LED is OFF

When using the 555 in this mode, try to keep R1 below 1M (although it will use up to a 13M resistor). This will ensure more accurate timing. If you need a circuit with a very accurate time out, use tantalum caps -- electrolytic tend to leak making inaccurate time-frames. The 555 in the monostable mode can create a time-out of between 10 milliseconds to as long as you want -- the only limit is that of the cap size. By using mulitpe 555s in a chain (one triggering the next...) you can have it time for days.

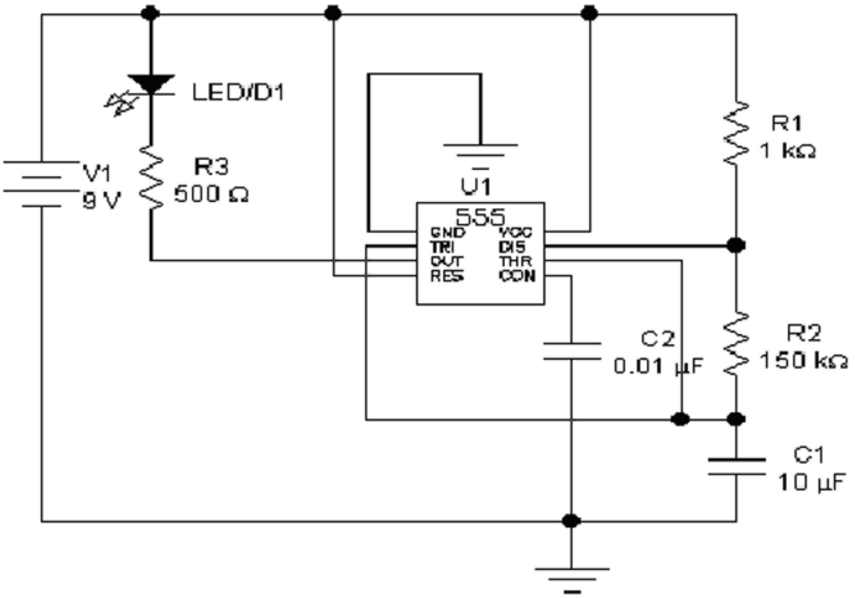
555 Timers: Astable

تستخدم ال٥٥٥ كمذبذب مستقر أي تنتج تردد معين نقوم بتحديده باستخدام المكونات الإلكترونية الخارجية التي سوف توضع مع ال ٥٥٥ .

A 555 set in the Astable mode is basically an oscillator. It changes states by itself according to the support components you choose. On(high) then Off (low) then On then off...

See the schematic below. The LED will turn on for approximately one second and off for one second then on...

555 Astable Multivibrator



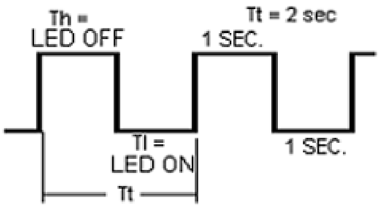
Note: The old version of this circuit was inefficient for certain applications. Please use this newer version in your projects. The LED lights with a low signal from the output pin now and the 1 Ohm resistor is replaced with a common 1KOhm version.

Description of Circuit:

This circuit requires very few external components. The main three are R1, R2 and C1. C2 is merely there to prevent instability problems. R3 limits current to the LED. A 9V battery is shown but you can use anything from 4.5 to 12Volts. I use either a 9V Battery or an adaptor set to 6V. If you want to interface the oscillator to a TTL circuit you must match that voltage, typically +5V.
Use a 150K and 1000 Ohm resistor in this newer circuit. The timing is nearly the same as the one that was previously posted.

NOTE: If the LED is not bright enough, use a smaller value resistor in place of R3.

The TIME HIGH (LED OFF) and TIME LOW (LED ON) are determined by R1, R2 and C1. Let's call the TIME HIGH Th and the TIME LOW Tl. The total time is Tt.



The formula to solve Th is:

$$Th = 0.693 \times C1 \times (R1 + R2)$$

In our circuit above R1 is 1,000 Ohms (1K), R2 is 150,000 Ohms (150K) and the Capacitor is .00001 Farads (10 microfarads). Let's solve for Th.

$$Th = .693 \times .00001 \times (1000 + 150{,}000)$$
$$Th = .693 \times .00001 \times 151000$$
$$Th = 1.042 \text{ Seconds}$$

Now to figure out the Time low, we use the same formula ignoring R1.

$$Tl = 0.693 \times C1 \times R2$$
$$Tl = .693 \times .00001 \times 150{,}000$$
$$Tl = 1.035 \text{ seconds}$$

All thats left to figure out is Time Total. Just add the Tl and Th.

$$Tt = Th + Tl$$
$$Tt = 2.077 \text{ seconds}$$

If you want to convert this to frequency instead of time:

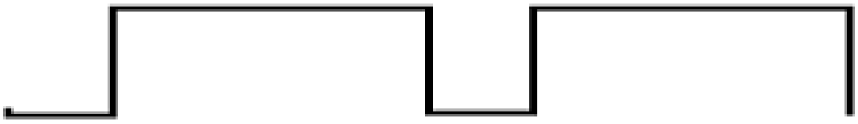
$$F = 1/Tt$$
F = .5 Hertz (Hz) or cycles per second.

You may ask why I used such a small resistor for R1. Doing this gives nearly the same time on as off. The ratio of time ON to total time is called *Duty Cycle*. The example circuit we made has a duty cycle of 1:2 or 50% (50% on and 50% off)

The reason the 1K resistor is used instead of a 1 Ohm unit is because the 1 Ohm was causing a high current situation. The 1K will produce almost the same results and not fry a low power 555.

To see how you would make a circuit with a longer time high (LED OFF) and shorter time low (LED ON), work out this example:
C1 = 10 microfarad (.00001 Farad)
R1 = 150K
R2 = 47K

$Th = .693 \times .00001 \times 197{,}000$
Th = 1.365 seconds.
$Tl = .693 \times .00001 \times 47{,}000$
Tl = .33 seconds

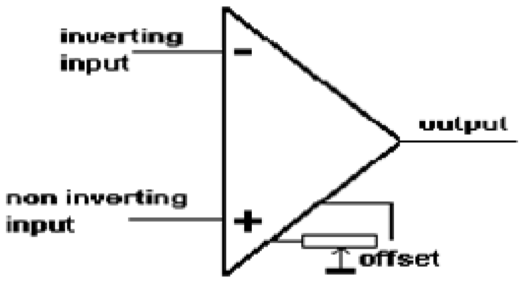


This produces a circuit with the LED on for .33 seconds and off 1.4 seconds. It's duty cycle is now 3:4 or 75%. There is a simple formula to figure out duty cycle.

Percentage of Duty Cyle = (Th divided by Tt) X 100

This example created a square wave form. Using the 555 in the Astable mode you can create other wave forms as well. We will see more circuits that create triangle and others in later 555 sections. A high frequency oscillator built with a 555 can be used to power a speaker, creating a sound waves. An example would be to create an alarm speaker driver. If two 555's are chained together, many sound effects can result.

THE OPERATIONAL AMPLIFIER



تم تصميم ال opamp للقيام بالعمليات الرياضية وهو عبارة عن دائرة متكاملة لها ثمانية أرجل واشهرها هو ٧٤١ . ولها دخلان وخرج واحد. والدخل عند علامة – ينتج عنة خرج معكوس له معامل تكبير . والدخل عند علامة + ينتج عنة خرج غير معكوس له معامل تكبير.

The opamp was originally designed to carry out mathematical operations in analogue computers, such as bombsights, but was soon recognised as having many other applications. The opamp usually comes in the form of an 8 pin integrated circuit, the most common one being the type 741.It has two inputs and one output.

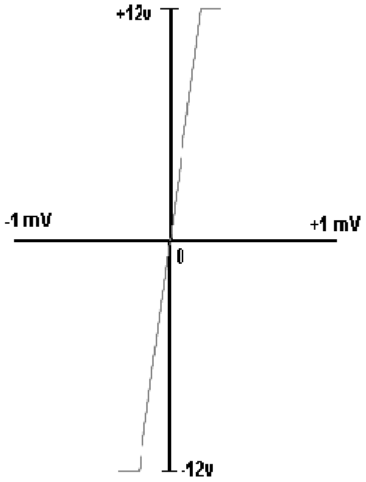
The input marked with a - sign produces an amplified inverted output.

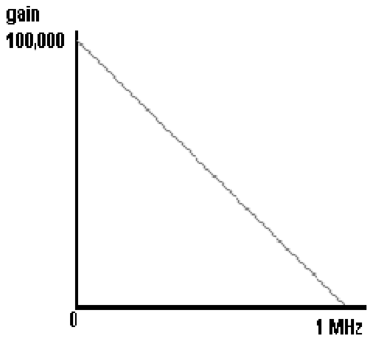
The input marked with a + sign produces an amplified but non inverted output.

The opamp requires positive and negative power supplies, together with a common ground. Some circuits can be designed to work from a single supply. If the two inputs are joined together, then the output voltage should be midway between the two supply rails, i.e. zero volts.

If it is not, then there are two connections for adding a potentiometer, to remove this OFFSET

OPAMP CHARACTARISTICS

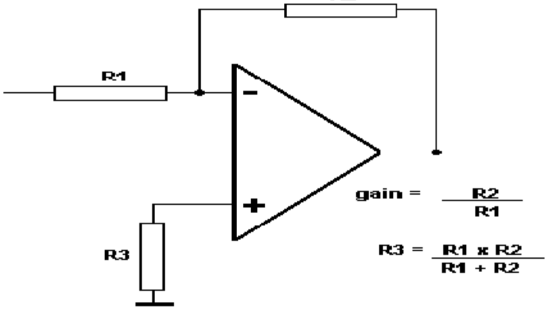




لل opamp معامل تكبير مرتفع جدا حوالي ١٠٠ ديسيبل أي حوالي مائة ألف مرة . يقل معامل التكبير كلما ارتفع تردد إشارة الدخل ويمكن تقليل هذا التأثير للتردد على معامل التكبير باستخدام التغذية العكسية (feed back) . وله مقاومة دخل مرتفعة 1M ومقاومة خرج منخفضة 150 Ohms .

The opamp has a very high gain, typically (100 dB)100,000 times.
Looking at the left hand diagram, an input with a swing of a fraction of a millivolt produces an output that changes between + 12 volts and - 12 volts.
In most cases this gain is excessive, and is reduced by negative feed back.
Looking at the right hand diagram we can see that the opamp amplifies right down to dc.
Gain falls quite rapidly as the frequency increases.
In fact the bandwidth (the point at which the output has fallen by 3 dB) is only 1 kHz.
This is also improved upon by the use of negative feedback.
The input impedance is high, 1M.
The output impedance is low, 150 ohms.

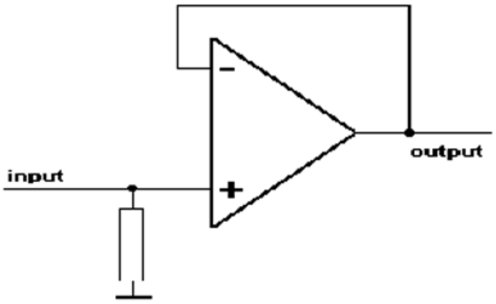
SETTING OPAMP GAIN



معامل التكبير للدخل عند علامة – يتحدد بقيمة المقاومتان R1 و R2 ولتقليل تاثير الحرارة نجعل قيمة المقاومة R3
تساوي قيمة المقاومتان R1 و R2عند توصيلهما على التوازي.

The gain of the inverting amplifier is determined by the feedback resistor R2, and the input resistor R1.
To minimize temperature drift, R3 is given the value of R1 and R2 in parallel.

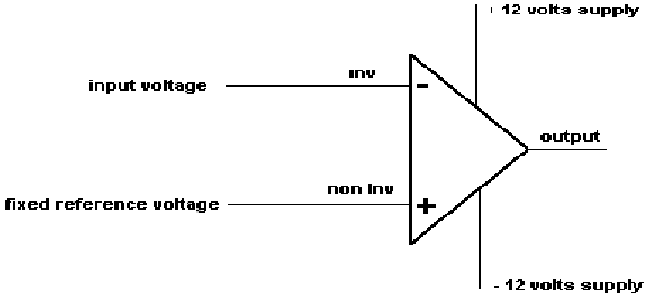
OPAMP AS VOLTAGE FOLLOWER



مكبر غير عاكس له معامل تكبير يساوي ١ . وله مقاومة دخل عالية ومقاومة خرج صغيرة يستخدم للموائمة الأحمال
ذات المقاومة العالية مع الأجهزة ذات المقاومة المنخفضة .

This non inverting amplifier has unity gain i.e. x1.
It is called a VOLTAGE FOLLOWER.
It serves the same purpose as the emitter follower.
It has a high input impedance and a very low output impedance.
It can be used for impedance matching.
It is able to drive several loads.

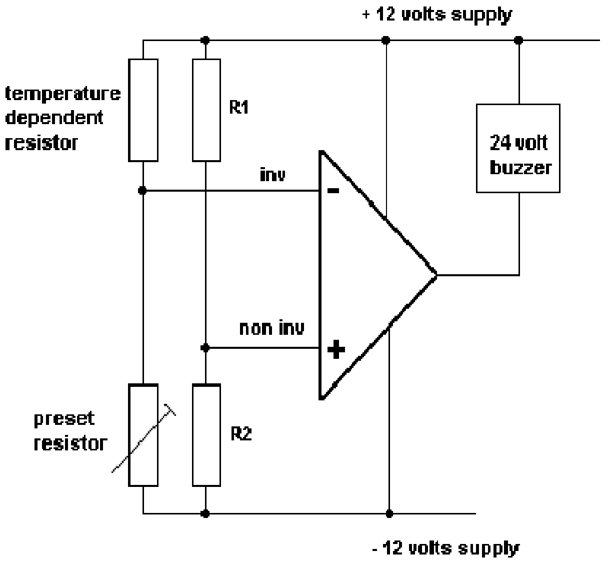
THE OPAMP AS A COMPARATOR



تستخدم لمقارنة جهد قياسي معروف القيمة بجهد آخر غير معروف القيمة فإذا كانت قيمة الجهد القياسي اكبر تكون إشارة الخرج موجبة وإذا كانت اصغر تكون قيمة الخرج سالبة.

**A varying input voltage is compared with a fixed reference voltage.
If the input voltage is higher than the reference voltage, then the output is negative.
If the input voltage is lower than the reference, then the output is positive.
The gain can be set by negative feedback.**

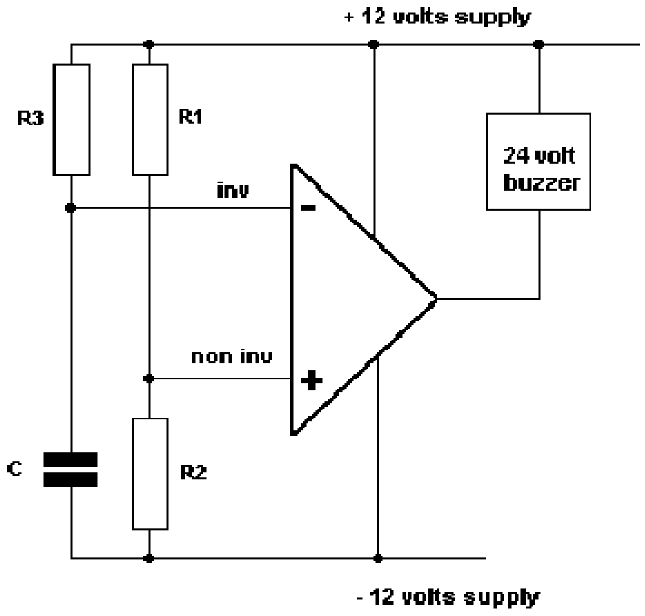
THE OPAMP AS A TEMPERATURE ALARM



نقوم بتوصيل الدائرة كأنها دائرة comparator . حيث يتم التحكم في الجهد القياسي عند علامة + (reference voltage) عن طريق المقاومتان R1 و R2 . ويتم التحكم في الجهد عند علامة – عن طريق البريسيت و المقاومة المتغيرة مع الحرارة فإذا زاد هذا الجهد عن الجهد القياسي يكون جهد الخرج بالسالب ويتم تشغيل دائرة ال BUZZER .

This circuit is configured as a comparator.
R1 and R2 provide a fixed reference voltage at the non inverting input.
The inverting input voltage is set by the other two resistors.
If the voltage at the inverting input rises above the reference voltage, then the output goes to minus 12 volts and the buzzer is energized.
The behavior of the circuit can be changed by swapping the preset and temperature dependent resistors.
Light dependent resistors etc can replace the temperature dependent one.

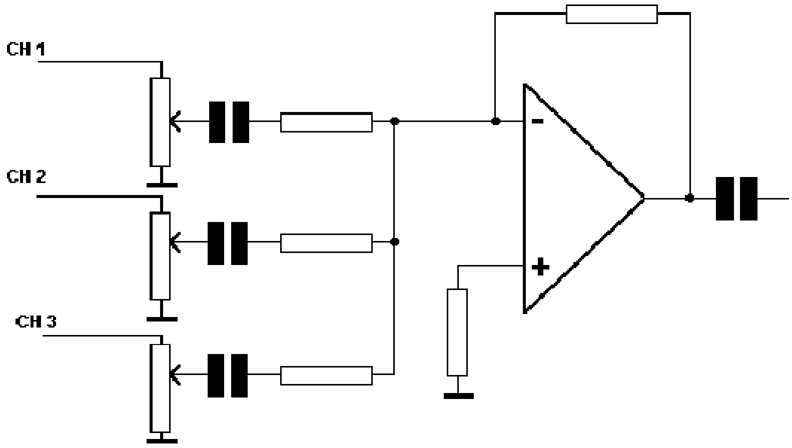
THE OPAMP AS A TIMER



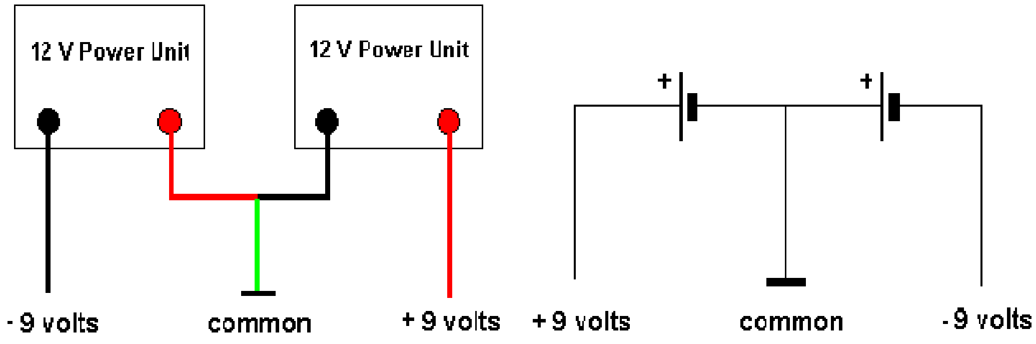
يتم تشغيل هذه الدائرة بنفس فكرة الدائرة السابقة مع استبدال البريسيت والمقاومة المتغيرة مع الحرارة بمكثف و مقاومة لتحديد المعامل الزمني لتشغيل دائرة ال BUZZER .

At switch on, the voltage across the capacitor is zero and the output is at +12 volts.
The buzzer is not energized.
After a time, determined by the values of C and R3, the voltage of the inverting input rises above that of the non inverting input.
The output goes to minus 12 volts and the buzzer is energized.

THE OPAMP AS AN AUDIO MIXER

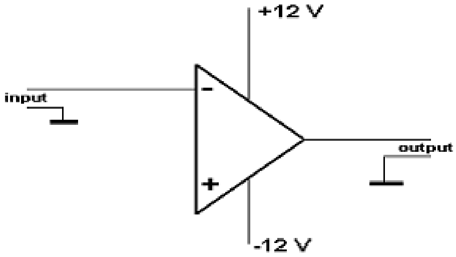


OPAMP DUAL POWER SUPPLIES



دوائر ال **opamp** تتطلب مصدرين للجهد مختلفي القطبية الشكل العلوي يبين طريق توصيل مصدري الجهد مع بعضهما والشكل السفلي يبين كيفية توصيلهم مع أطراف الدخل والخرج لل **opamp** .

Most opamp circuits require two differing polarity voltages.
The upper diagram shows how the two supplies are connected together.
The bottom diagram shows how the common lead of the power supplies is connected to the input and output (and the common connection of any other associated circuitry).



Most Common IC s And Its Functionality

4000 CMOS

Part Number	Description
4001	IC, Quad 2 Input NOR
4002	IC, Dual 4 Input NOR
4006	IC, 18 Bit Static Shift Register
40102	IC, Presettable 2 Decade Down Counter
40106	IC, Hex Schmit Inverter
4011	IC, Quad 2 Input NAND
4012	IC, Dual 4 Input NAND
4013	IC, Dual D Flip Flop
4013	IC, Dual D Flip-Flop
4015	IC, Dual 4 Stage Shift Register
4016	IC, Quad Bilateral Switch
4017	IC, Decade Counter/Divider
4018	IC, Presettable Divide-By-B
4020	IC, 12 Stage Binary Counter
4023	IC, Triple 3 Input NAND
4025	IC, Triple Input OR
40257	IC, Quad 2 Line To 1 Line Data Selector/Multiplexer
4027	IC, Dual J-K Flip-Flop
4028	IC, BCD To Decimal Decoder
4029	IC, Presettable Binar/Decimal Up/Down Counter
4030	IC, Quad 2 Input XOR

4034	IC, Bidirectional Bus Register
4040	IC, 12 Stage Binary Counter
4041	IC, Quad True/Complement Buffer
4042	IC, Quad D Latch
4042	IC, Quad Clock D Latch
4046	IC, Phased Locked Loop
4049	IC, Hex Inverter Buffer
4050	IC, Hex Non-Inverting Buffer
4059	IC, Programable Divide-By-N
4066	IC, Quad Bilateral Switch
4067	IC, Analog Multiplexer/Demultiplexer
4068	IC, 8 Input NAND
4069	IC, Hex Inverter
4070	IC, Quad EXOR
4071	IC, Quad 2 Input OR
4072	IC, Dual Input OR
4073	IC, Triple 3 Input AND
4075	IC, Triple 3 Input OR
4081	IC, Quad 2 Input AND
4082	IC, Dual 4 Input AND
4093	IC, Quad 2 Input NAND Schmit
4502	IC, Strobed Hex Inverter
4508	IC, Dual 4 Bit Latch
4510	IC, BCD Up/Down Counter
4511	IC, BCD To 7 Segment Latch/Decoder/Driver
4514	IC, 4 Bit Latch, 4 To 16 Decoder
4515	IC, 4 Bit Latch, 4 To 16 Decoder
4516	IC, Binary Up/Down Counter
4518	IC, Dual BCD Up/Down Counter
4520	IC, Dual Up/Down Counter
4528	IC, Dual Monostable Multivibrator
4538	IC, Monostable Multivibrator
4553	IC,

74xx sieres

Part Number	Description
7400	IC, Quad 2 Input NAND
7402	IC, Quad 2 Input NOR
7403	IC, Quad 2 Input NAND Open Drain
7404	IC, Hex Inverter
7405	IC, Hex Inverter Open Collector
7406	IC, Hex Inverter Buffer/Driver
7407	IC, Hex Buffer Driver
7408	IC, Quad 2 Input AND
741	IC, OP AMP
7410	IC, Triple 3 Input NAND
7411	IC, Triple 3 Input AND
74121	IC, Retriggerable Monostable
74123	IC, Dual Retriggerable Monostable Multivibrator w/reset
74125	IC, Quad 3 State Buffer
74132	IC, Quad Schmitt Trigger
74132N	IC, Quad 2 Input NAND Schmitt Trigger
7414	IC, Hex Inverting Schmitt Trigger
74151	IC, 8 Input Multiplexer
74155	IC, Dual 2/4 Demultiplexer
74156	IC, Dual 2/4 Demultiplexer
74157	IC, Quad 2/1 Data Selector
7416	IC, Hex Buffer Driver
74161	IC, Sync 4 Bit Binary Counter Async Reset
74164	IC, 8 Bit Serial Shift Register
7417	IC, Hex Buffer/Driver Open Collector High Voltage
74177	IC,
74193	IC, Syncronous 4 Bit Up/Down Counter
7420	IC, Dual 4 Input NAND
74221	IC, Dual Monostable Multivibrator w/Reset
74259	IC, 8 Bit Addressable Latch
7427	IC, Triple 3 Input NOR
74366	IC, Tri-State Hex Buffer
7438	IC, Quad 2 Input NAND Open Collector
7442	IC, BCD to Decimal Decoder

7473	IC, Dual J-K Flip Flop w/reset
7474	IC, Dual D Flip Flop
7475	IC, Dual JK Master/Slave Flip Flop
7476	IC, Dual JK Flip Flop With Preset and Clear
7486	IC, Quad XOR
7493	IC, 4 Bit Binary Ripple Counter
7493	IC, 4 Bit Counter
7495	IC, 4 Bit Parallel Access Shift Register

74Lxx &74Sxx series

Part Number	**Description**
74L85	IC, 4 Bit Magnitude Comparator
74S00	IC, Quad 2-input NAND Gate
74S02	IC, Quad 2 Input NOR
74S04	IC, Hex Inverter
74S08	IC, Quad 2 Input AND
74S124	IC, VCO
74S138	IC, Expandable 3/8 Decoder
74S139	IC, Expandable 2/4 Decoder
74S158	IC, Quad 2/1 Multiplexer
74S163	IC, Synchronous 4 Bit Counter
74S280	IC, 9 Bit Parity Generator
74S32	IC, Quad 2 Input OR
74S374	IC, Octal D Flip Flop Tri-State
74S64	IC, AND-OR Inverter
74S74	IC, Dual D Flip Flop

74LSxx series

Part Number	**Description**
74LS00	IC, Quad 2 Inout NAND
74LS02	IC, Quad 2 Input NOR
74LS03	IC, Quad 2 Input NAND
74LS04	IC, Hex inverter
74LS05	IC, Hex inverter Open Collector
74LS06	IC, Hex Buffer/Driver Open Collector Output

74LS08	IC, Quad 2 Input AND
74LS10	IC, Triple 3 Input NAND
74LS109	IC, Dual J-K Flip Flop w/Set & Reset
74LS11	IC, Triple 3 Input AND
74LS112	IC, Dual JK Flip Flop
74LS123	IC, Monostable Multivibrator
74LS125	IC, Tri-State Quad Buffer
74LS13	IC, Quad 2 Inout NAND Schmitt
74LS132	IC, Quad Schmitt Trigger
74LS133	IC, 13 Input NAND
74LS138	IC, Expandable 3/8 Decoder
74LS139	IC, Dual Expandable 2/4 Decoder
74LS14	IC, Hex Schmitt Trigger
74LS151	IC, 8 Input Multiplexer
74LS153	IC, Dual 4 Input Multiplexer
74LS154	IC, 4 to 16 Line Decoder
74LS155	IC, Dual 2/4 Demultiplexer
74LS157	IC, Quad 2/1 Multplexer
74LS161	IC, Presettable Binary Counter
74LS163	IC, Presettable Binary Counter
74LS164	IC, 8 Bit Shift Register
74LS165	IC, Parallel Load 8 Bit Serial Shift Register
74LS169	IC, Synchornous Binary U/D Counter
74LS173	IC, Quad D Register Tri-State
74LS174	IC, Hex D Flip Flop
74LS174	IC, Hex D Flip Flop
74LS175	IC, Quad D Flip Flop
74LS192	IC, Decade Up/Down Counter w/reset
74LS193	IC, Synchronous 4 Bit Binary Up/Down Counter
74LS20	IC, Dual 4 Input NAND
74LS20	IC, Dual 4 Input NAND
74LS221	IC, Dual Monostable Multivibrator w/reset
74LS240	IC, Octal Inverter Bus/Line Driver
74LS243	IC, Quad Bus Transceiver
74LS244	IC, Octal Driver Non-Inverting Tri-State

74LS244	IC, Octal Driver Non-Inverting Tri-State For Mixer Project
74LS245	IC, Octal Transceiver
74LS253	IC, Dual 4 Input Multi Tri-State
74LS253	IC, Dual 4 Input Multiplexer Tri-State
74LS257	IC, Quad 2 Channel Tri-State Multiplexer
74LS26	IC, Quad 2 Input NAND
74LS260	IC, Dual 5 Input NOR
74LS27	IC, Triple 3 Input NOR
74LS273	IC, 8 Bit D Type Register
74LS30	IC, 8 Input NAND
74LS32	IC, Quad 2 Input NOR POS OR
74LS33	IC, Quad 2 Input NOR Open Collector
74LS367	IC, Hex Buffer Tri-State
74LS373	IC, Octal Transparent Latch
74LS374	IC, Octal Dual Flip Flop Tri-State
74LS375	IC, Quad Bistable Latch
74LS393	IC, Dual 4 Bit Counter
74LS42	IC, BCD to Decimal Decoder
74LS51	IC, Dual 2 Input AND/OR Inverter
74LS540	IC, Octal Buffer Line Driver, 3 State Inverting
74LS541	IC, Octal Buffer/Line Driver w/Tri-State Output
74LS640	IC, Octal Bus Tranceiver, 3 State Inverting
74LS73	IC, Dual J-K Flip Flop w/Reset
74LS74	IC, Dual D Flip Flop
74LS75	IC, Dual 2 Bit Bistable Transparent Latch
74LS76	IC, Dual JK Flip Flop with Reset &Clear
74LS85	IC, 4 Bit Magnitude Comparator
74LS86	IC, Quad XOR
74LS90	IC, Decade Counter
74LS93	IC, Sychronous 4 Bit Binary Up/Down Counter

ADC & DAC SERIES

Part Number	Description
AD1380JD	IC, 16 Bit ADC with Sample/Hold
AD532KD	IC,Internally Trimmed Multiplier/Divider
AD533JH	IC, Multiplier
AD550JD	IC, Multiplier/Divider
AD550KD	IC, Multiplier/Divider
AD550LD	IC, Multiplier/Divider
AD558KN	IC, 8 Bit Digital To Analog Converter
AD639AD	IC, Universal Trigonometric Function Converter
AD7228ABN	IC, 8 Channel, 8 Bit Digital To Analog Converter
AD7582KN	IC, 12 Bit ADC 4 Input
ADC0803LCN	IC, 8 Bit A/D Converter 1/2 LSB
ADC10664CIN	IC, 10 Bit 4 Channel A/D
ADC71JG	IC, A/D Converter
ADC-MC8BC	IC, Analog to Digital Converter
DAC100CC02	IC, Digital to Analog Converter

CYBERNTICS

Part Number	Description
CY232	IC, Parallel/Serial Interface and Network Controller
CY233	IC, Local Intelligent Network Controller
CY250	IC, Local System Controller
CY512	IC, Intelligent Positioning Stepper Motor Controller
CY525	IC, Intelligent Ramping Stepper Motor Controller
CY525A	IC, Intelligent Ramping Stepper Motor Controller
CY545A	IC, High Performance Stepper System Controller
CY750	IC, Programmable Controller

DRIVERS

Part Number	Description
MOC3010	IC, OptoTriac Driver Output
PA10	IC, Power Op Amp
Q4025L6-ND	Triac, 25A 400V
SG3635R	IC, 2A Half-Bridge Driver
UDN2595A	IC, 8 Channel Sink Driver
UDN2841B	IC, Quad 1.5A Darlington Drivers
UDN2981A	IC, 8 Channel Source Driver
ULN2003A	IC, Seven darlington Array
ULN2064B	IC, 50V -1.5A Quad Darlington Switches
ULN2823A	IC, Darlington Array
TSC427CPA	IC, Dual Power MOSFET Driver Non-Inverting (replacement for DS0026)
SNC55464JG	IC, Dual Peripheral Drivers
145406	IC, RS-232 Driver/Receiver
1488	IC, Quad Line Driver
1489	IC, Quad Line Receiver
75451	IC, Dual Peripheral AND Driver
75452	IC, Dual Peripheral NAND Driver
75452CN	IC, Dual Peripheral Driver
75453	IC, Dual Peripheral OR Driver
DS0026	IC, Dual MOS Clock Driver

EPLD – PAL

Part Numbe	Description
PAL16L8-25	IC, PAL
PAL16R6-25	IC, PAL
PAL16R8-25	IC, PAL
PSD3012-12	IC, Programmable Peripheral
EP600DC	IC, EPLD 600 Gate
5C060	IC, EPLD 600 Gate
5C090	IC, EPLD, 900 Gate OTP

LINEAR IC s

Part Number	Description
1458	IC, Dual Op Amp
2277	IC, 2 W Stereo Amp
239	IC, Stereo PreAmp
339	IC, Low Power Low Offset Quad Voltage Comparator
3606AG	IC, Programmable Gain Amp
4558	IC, Dual Op Amp
555	IC, Timer
556	IC, PLL
558	IC, Dual timer
566	IC, Voltage Controller Oscillator
567	IC, Tone Decoder Phase Lock Loop
6040	IC, Voltage Controlled Amp
6845	IC, Video Controller
8038	IC, Function Generator
AD118A	IC, OpAmp
AD811	IC, High Performance Video Op Amp
AD821	IC, Dual Current Feedback Low Power OpAmp
CA3060	IC, Triple Operational Transconductance Amp
CA3079	IC, Zero Voltage Switch for Thyristor Control
CA3100E	IC, Wide Band OpAmp
CA3130E	IC, Op Amp
CA3140AE	IC, MosFet In/Bipolar Out 741 Replacement
CA3140E	IC, Op Amp
CA3160AE	IC, Op Amp BIMOS
CA3160AF	IC, BiMOS OpAmp MosFet In/Cmos Out Single Supply
CA3240E	IC, Op Amp
CA3401G	IC, Quad Amp (LM3900N)
CMP01	IC, Fast Precision Comparator
LH0002CN	IC, Current Amplifier
LH002CN	IC, Current Amplifier For Mixer Project
LM1830	IC, Fluid Detector
LM301	IC, General Purpose OpAmp
LM308	IC, OpAmp
LM311N	IC, High Performance Voltage Comparator
LM318P	IC, High Slew Rate OpAmp
LM324	IC, Low Power Quad OpAmp

LM324N	IC, Quad Low Power OpAmp
LM331	IC, Precision Voltage to Frequency Converter
LM339N	IC, Quad Comparator
LM349N	IC, OpAmp Wide Band Decompensated for Mixer Project
LM356BN	IC, For Mixer Project
LM358N	IC, Low Power Dual OpAmp
LM359N	IC, Dual High Speed Programmable Current Mode Amplifier For Mixer Project
LM381AN	IC, Low Noise Dual Preamplifier For Mixer Project
LM387	IC, Low Noise Dual Preamplifier
LM387AN	IC, Low Noise Dual Preamplifier For Mixer Project
LM3900	IC, Quad Amplifier
LM393AN	IC, Dual Comparator
LM566	IC, Voltage Controlled Oscillator
LM733CP	IC, Video Amp
LT1014CN	IC, Quad Precision OpAmp
MC3407	IC, Op Amp
MC4024	IC, Dual Voltage Controlled Multivibrator
OP27	IC, Low Noise Precision OpAmp

Misc

Part Number	Description
	LCD, 1x16 Display (double board)
0047-0100-02	IC, Delay Line
03802-08-016	LCD, 1x16 Display (single board)
1519-200B	IC, Delay Line
30DB040D	IC, Transpack NPN Power Darlington Module 500V @ 45A
G120DT	Scanner, Galvo with feedback

Relays

Part Number	Description
120D-10	Relay, Solid State 120VAC@10A 3-32dc in
226R-1-5A1	Relay, Solid State
226RE-1-5A1	Relay, Solid State
CSD2410	Relay, Solid State 240VAC@10A 3.5-15dc in

D2425	Relay, Solid State 240VAC@25A 3-32dc in
D2W202F	Relay, Solid State 240vac@2a 3-28vdc in
D2W203F	Relay, Solid State 240vac@3a 3-28vdc in
MSR-100B	Relay, Solid State 120VAC@10A 2.5-30dc in

Switches

Part Number	Description
LMD18400	IC, Quad High Side Switch
5012	IC, Quad Switch
7501	IC, 8 Channel Analog Multiplexer
7502	IC, Dual 4 Channel Analog Multiplexer
7510	IC, Quad Analgo SPST Switch
7511	IC, Quad Analog SPST Switch
AD7510	IC, Quad SPST Analog Switches
AD7512	IC, Dual SPDT Analog Switches
AH5012CN	IC, Quad SPST Analog Switch
IH6108CPE	IC, Multiplexer

Transistors

Part Number	Description
2N2102	Transistor, NPN
2N2219	Transistor,
2N2222	Transistor, NPN
2N2616	Transistor,
2N2646	Transistor, UJT
2N2905	Transistor,
2N2907	Transistor,
2N2907	Transistor,
2N3055	Transistor, Power
2N3442	Transistor, NPN Power
2N3567	Transistor, NPN
2N3568	Transistor,
2N3569	Transistor, NPN
2N3638	Transistor, PNP
2N3644	Transistor,
2N3645	Transistor, PNP

2N3819	Transistor, N-FET
2N3820	Transistor, P-FET
2N4033	Transistor,
2N4036	Transistor, PNP
2N4123	Transistor,
2N4124	Transistor,
2N4125	Transistor,
2N4126	Transistor,
2N4401	Transistor,
2N5086	Transistor, PNP
2N5088	Transistor, NPN
2N5363	Transistor,
2N5458	Transistor,
75468	IC, Darlington Transistor Arrays
BDW93C	Transistor,
CA3081	IC, General Purpose High Current NPN Transistors C
CA3083	IC, 5 Transistor Hi Current
D44VH10	Transistor,
D45H5	Transistor,
D45VH10	Transistor,
IMPS3702	Transistor,
IRF621	Transistor, HexFet N-Channel
IRF9523	Transistor, HEXFET P-Channel
IRFD112	IC, N Channel MOSFET 4 Pin DIP 60v 1.3a
MAT01GH	Transistor,
MD8003	Transistor, Dual NPN
MJE1093	Transistor,
MJE1103	Transistor,
MPSA13	Transistor,
VN2222LL	Mosfet, N Channel Small Signal
SK3112	Transistor, FET N Jannel
TIP120	Transistor,
TIP125	Transistor,

UARTs

Part Number	Description
16C550AN	IC, UART
8116	IC, Baud Rate Generator
8251	IC, UART
IM4702IJE	IC, Baud Rate Generator

u Processors

Part Number	Description
	Z80ASIO
486	IC, 486-50 Microprocessor
8035L	IC, Microprocessor
8073	IC, Basic CPU
8087	IC, Math Co-processor
8088	IC, Microprocessor
80C196KC16	IC, Microcontroller
80C198	IC, Microcontroller
C8748-8	IC, Microprocessor
CDP1802ACE	IC, Microprocessor
CDP1802CD	IC, Microprocessor
CDP1802CE	IC, Microprocessor
CDP1805ACE	IC, Microprocessor
CDP1806CD	IC, Microprocessor
CDP1806CE	IC, Microprocessor
Micon Proto	Board, Proto
Micon-196KC	Computer, 80C196
MK38P70/02H	IC, Micorprocessor
Pentium	IC, Pentium - preproduction
Z80-CPU	IC, CPU

U Processor support

Part Number	Description
8155H	IC, Timer & Parallel I/O
81LS95N	IC,
82188	IC, 188/186 Bus Controller
8237AC	IC, DMA Controller
8243	IC, I/O Expander for 48 Series
82530-6	IC, Serial Communications Controller Dual Channel
8253-5	IC, Programmable Interval Timer
8255A-5	IC, Parallel I/O
8272	IC, Floppy Disk Controller
8281	IC,
8282	IC, Octal Latch
8286	IC, Octal Transceiver
8288	IC, Buss Controller
82C51A	IC, Programmable Communications Interface (USART) CMOS
8713	IC,
CDP1804PCE	IC, Pascal Microprocessor and ROM
CDP1851CE	IC, Programmable I/O
CDP1852CE	IC, 8 Bit I/O Port
CDP1853CD	IC, N-Bit 1 of 8 Decoder
CDP1853CE	IC, N Bit 1/8 Decoder
CDP1854	IC, UART
CDP1856CE	IC, 4 Bit Bus Buffers/Separators
CDP1857CE	IC, Bus Buffer/Seperator
CDP1858CE	IC, 4 Bit Latch With Decode
CDP1866CE	IC, 4 Bit Latch/Decoder
CDP1867CE	IC, Bus Buffer, I/O
CDP1873CE	IC, Demultiplexer
CDP1874CE	IC, 8 Bit Latch
CDP1877CE	IC, Programmable Interrupt Controller
CDP1878CE	IC, Dual Counter
CDP1879CE	IC, Real Time Clock
DS1837	IC, Real Time RAM
Z80-CTC	IC, COUNTER
Z8420BPS	IC, Z80 PIO
Z8420BPS	IC, Z80 PIO

Z80A-CPU	IC, Z80A CPU
Z80A-CTC	IC, Z80A Counter Timer
Z80A-DMA	IC, Z80 Direct Memory Access
Z80A-PIO	IC, Z80A PIO
Z80A-SIO0	IC, Z80A Serial Controller
D765C	IC, Floppy Controller
WD1770PH	IC, Disk Controller

Voltage regulators

Part Number	**Description**
	Power Supply, 5v@1a, +-12v@250mA Linear
7805CT	IC, 5v @ 1A Regulator TO-220
7805KC	IC, 5V 1A Voltage Regulator
7812	IC, 12V @ 1A Regulator
7815C	IC, 5V @ 1A Regulator
78L12	IC, 12v Votlage Regulator
7905C	IC, -5V @ 1A Regulator
7905CT	IC, -5v Voltage Regulator
7908C	IC, -8V Voltage Regulator
7915C	IC, -15V @ 1A Regulator
79L05	IC, -5V 100mA Voltage Regulator
79L12	IC, -12v 100mA Voltage Regulator
79M15C	IC, -15V 500mA Regulator
DC-10	Regulator, Voltage DC Convertor
ICL7660	IC, Voltage Converter
LM336	IC, x.x V Voltage Reference
LM337KC	IC, Voltage Regualtor
LM338	IC, 5A Adjustable Positive Regulator
LM340T5	IC, 5V @ 1A Regulator TO-220
LM7912T	IC, -12v 1A Voltage Regulator
LT1009	IC, 2.5V Reference
REF02CP	IC, +5V Precision Voltage Reference
SLD-15-3030-15	Power Supply, Dual 15v@3a - Linear
LM323K	IC, 5V @ 3A Regulator TO-3

Motion control

Part Number	Description
L290B	IC, Tachometer Converter
L291	IC, 5 Bit D/A Converter and Position Amplifier
L292	IC, Switch-Mode Driver for DC Motors
L293B	IC, Push-Pull 4 Channel Drivers
L294	IC, Switch-Mode Solenoid Driver
L295	IC, Dual Switch-Mode Soleniod Driver
L297	IC, Stepper Motor Controller
L298	IC, Dual Full-Bridge Driver
HCTL-2016	IC, Quadrature Decoder/Counter Interface
LMD18201	IC, 3a, 55v H-Bridge
PWM8713	IC, Stepper Motor Controller

Opto

Part Number	Description
3700	IC, opto
4N26	IC, Photo Transistor 6 Pin Dip
5082-4207	Opto,
5082-7302	Opto,
FF627	Opto, FotoFet
HLMP-2685	LED, 7 bar
IEE7164H	LED, 10 bar
IL-1	IC, Opto
LM3914	IC, Dot/Bar Graph Display Driver
LR1720R	LED, 7 segment 1" w/decimal
MCT210	IC, Opto Photo Transistor Output
NSM-4005	Display, 4 Digit LED
OPI2500 or IL-1	IC,

Oscillators

Part Number	Description
K1100A-13	Oscillator, 13.5168 MHz
KCO-120S-33.3	Oscillator, 33.33MHz
X0-43D	Oscillator, 11 MHz
XO-33B-8.0	Oscillator, 8 MHz

Other IC s

Part Number	Description
140504B	IC,
1455	IC, MC1455 Single Timing Circuit
8T20	IC, Bi-Directional One Shot
8T26A	IC, Tri-State Quad bus Transceiver
9602	IC, Dual One Shot
AM9128	IC,
CDM62256E10	IC,
CL-CD180-10PC	IC,
CL-CD2400-10PC	IC,
DG141BP	IC,
DP8304	IC, 8 Bit Bi-Directional Receiver
DS1267-010	IC, Dual Digital Potentiometer
DS1287	IC, Real Time Clock w/battery
DS1620	IC, Digital Thermometer and Thermostat
FD1791B-01	IC, Floppy Disk Controller
ICL8211CPA	IC, Programmable Voltage Level Detector 8 Pin DIP
ICM555IPA	IC, CMOS 555 Timer
ICM7170	IC, Real Time Clock
ICM7213IDP	IC, One Second/One Minute Timebase Generator
ICM7217BIJI	IC, 4 Digit LED Display Programmable Timer Common Anode
IH5012CPE	IC, Quad Switch For Mixer Project
MB81461-12-SL	IC,
MC14504	IC,
MM451	IC,
MM5240AA0	IC,
MM5311	IC,
NE5018	IC,
NE5018N	IC,
NE5019N	IC,
S5024O	IC,
SG3731N	IC, PWM
SHC80KP	IC, Sample and Hold
SSM2402	IC, For Mixer Project

VL16C452	IC,
VL7C212A-CP	IC,
VL7C213-CP	IC,
VL7C214-CP	IC,
VL82C101	IC,
VL82C102	IC,
VL82C103	IC,
VL82C104	IC,
WD51B	IC, Irrigation Controller

Diodes

Part Number	Description
1N4148	Diode,
1N456	Diode,
1N4635A	Diode,
1N4728A	Diode,
1N4751	Diode,
1N5000	Diode, 3A 1000PRV
1N5237	Diode, 8.2v Zener
1N5237A	Diode, 8.2v Zener
1N5250	Diode, 10v Zener
1N571	Diode, 5.1v Zener
1N756A	Diode, 8.2v Zener
GE-1102	Diode, 2A 100piv
GE1304	Diode,
MR821	Diode,
P6KE	Diode,

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1- ELECTRONIC TRANSISTOR IGNITION FOR CARS

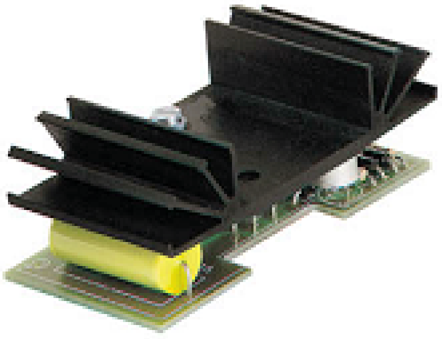
ترانزيستور الكتروني لبدء تشغيل السيارة

تعمل هذه الدائرة على تقليل التيار المسحوب من بطارية السيارة عند بداية تشغيلها. كما تساعد علي التقليل من استخدام الوقود، كما تساعد علي تقليل التلوث، وتوفر في خدمات الصيانة. التيار المستخدم ٤ امبير.

Gives your car the feel of an expensive luxury car. Better starting and smoother running, particularly at very high and very low RPM. Lower fuel consumption, less pollution, lower servicing costs. Drive economically, drive electronically. Only for petrol/gasoline engines. Only for cars with negative ground.

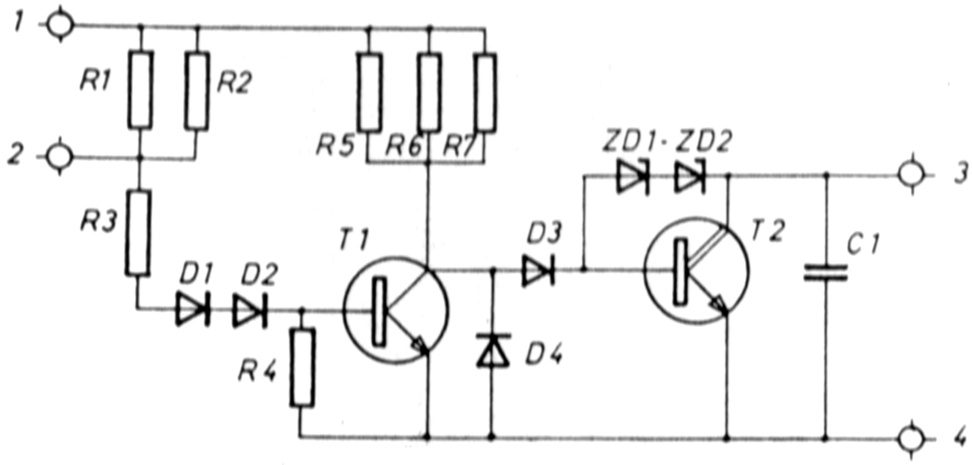
Specifications

- Max. current : 4A
- Connection Speed : up to 500kHz
- PCB Dimensions : 70 x 35mm (2.8" x 1.4")

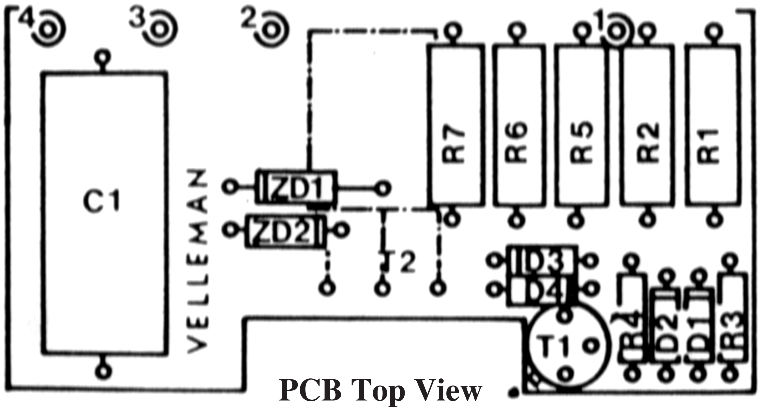


Hints

- For use on a 6V system replace next parts :
  - R1 and R2 : 150 ohm / 1W
  - R3 : 68 ohm 1/4W
  - R5, R6 and R7 : 68 ohm / 1W



Circuit Diagram



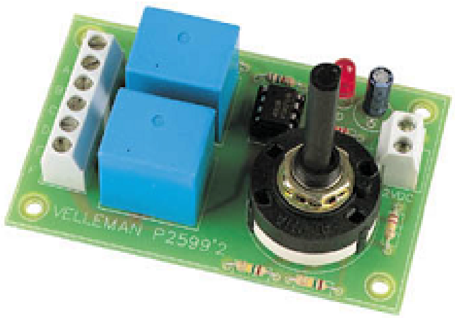
PCB Top View

2- WINDSHIELD WIPER ROBOT OR INTERVAL TIMER

دائرة توقيت متعددة الفترات الزمنية

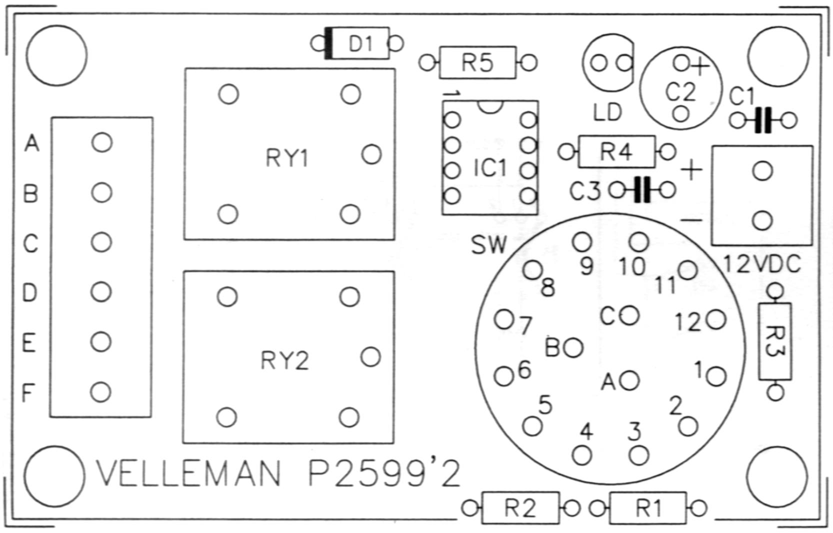
هذه الدائرة تعتمد على الشريحة المتكاملة للمؤقت العادي.
بواسطة مفتاح اختيار يمكنك ان تختار بين ثلاثة ازمنة مختلفة ٢ ، ١٠ ، ١٥ ثانية. جهد التشغيل المستخدم ١٢- ١٥ فولت.

Up to 3 different time intervals
(2 - 10 - 15 seconds) can be selected
for the windshield wipers of your car.
It can also be used for automatic slide projection.
Manual includes installation instructions for most cars.

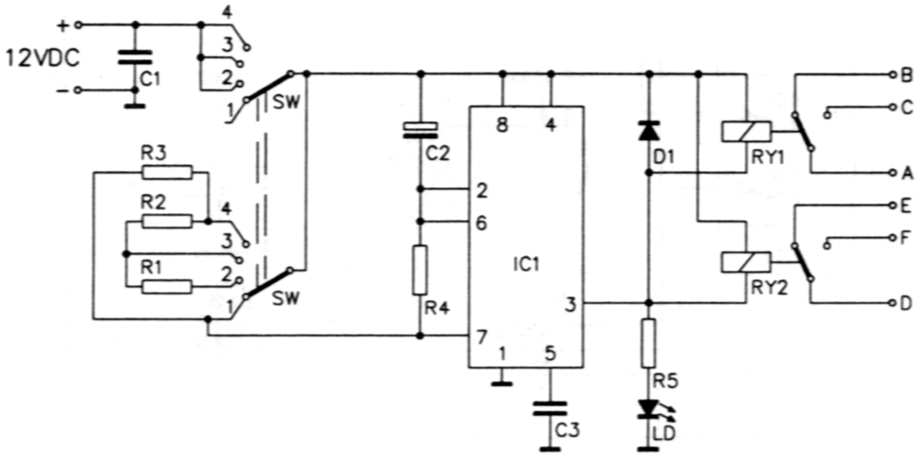


Specifications

- Relays on PCB : 2 inverters
- Power Supply : 12 - 15VDC
- PCB Dimensions : 82 x 56mm (3.2" x 2.2")



Circuit Diagram



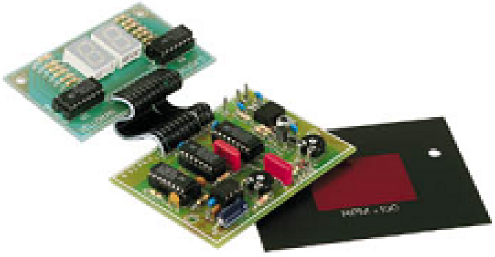
PCB Top View

3- DIGITAL TACHOMETER

جهاز قياس رقمي لحساب عدد اللفات التي يقطعها الموتور في الدقيقة

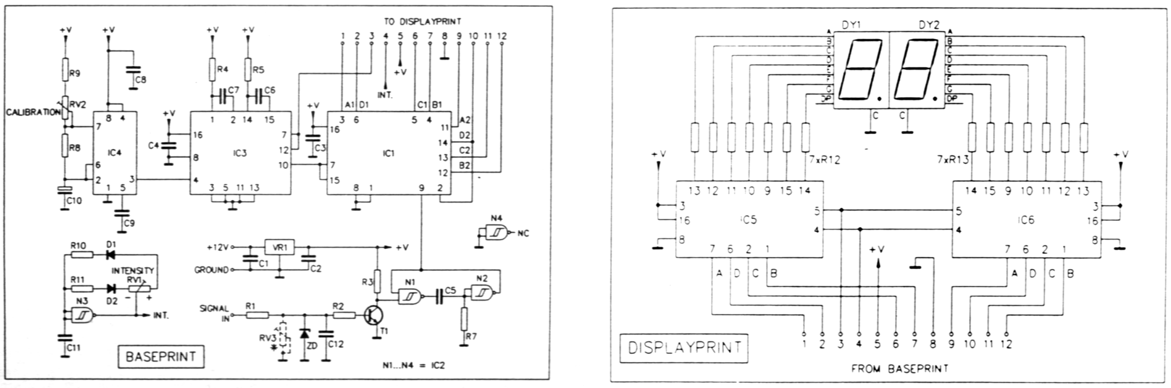
تعمل هذه الدائرة على تحويل الطاقة المستهلكة بواسطة المحرك الي عدد لفات عن طريق المعايرة، وتضرب القراءة الاخيرة فى مائة لحساب عدد لفات المحرك فى الدقيقة. المدي ١٠٠ - ٩٩٠٠ لفة في الدقيقة. الجهد المستخدم ١٠-١٥ فولت تيار مستمر، التيار المستخدم ٢٠٠ ميلي امبير.

For cars or motorcycles with a petrol engine. May be used as a general purpose revolution counter.

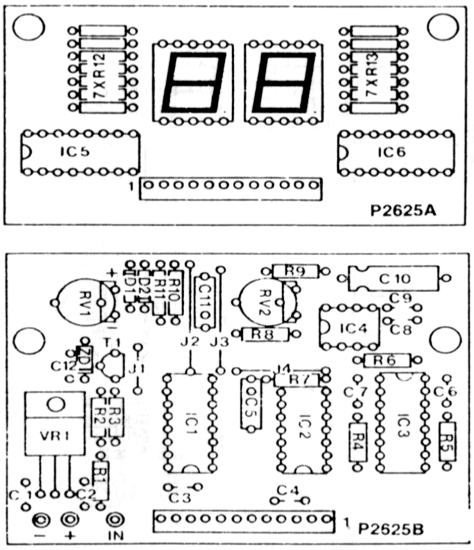


Specifications

- Range : 100 - 9900 revolutions/minute
- 2 digit Display
- Easy Calibration
- Power Supply : 10 - 15VDC / 200mA
- PCB Dimensions : 80 x 45mm (3.2" x 1.8") + 80 x 60mm (3.2" x 2.4")
- Front Panel Dimensions : 70 x 90mm (2.8" x 3.5")



Circuit Diagrams



PCB Top View

4- FROST INDICATOR

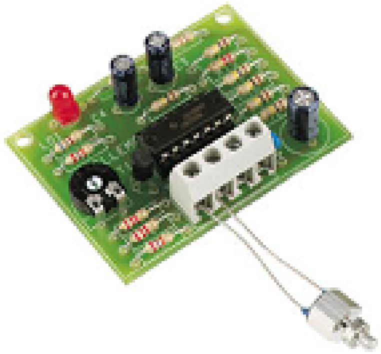
دائرة لتوضيح تجمد المياه

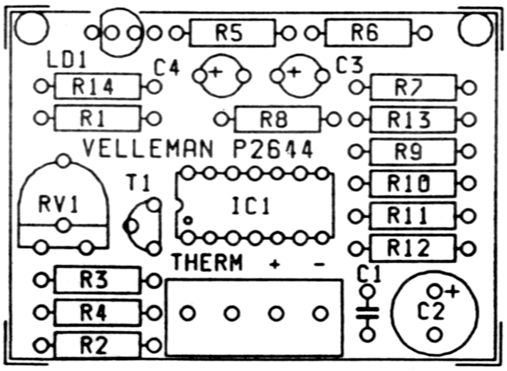
الموحد الضوئى يبدأ فى الذبذبة لفترة زمنية قصيرة عند الاحساس بدرجة حرارة +٣ سيليزية، ثم تبدأ الفترة الزمنية للذبذبة فى التضاؤل عند درجة -٣ سيليزية ثم بعد ذلك يظل مضيء باستمرار. الجهد المستخدم ١٠-١٥ فولت، التيار المستخدم ٢٥ ميلي امبير.

Drive more safely in freezing weather. This kit uses a flashing LED to indicate a road temperature close to freezing point ; below that point the LED is on continuously. A reliable temperature sensor with mounting stud is included.

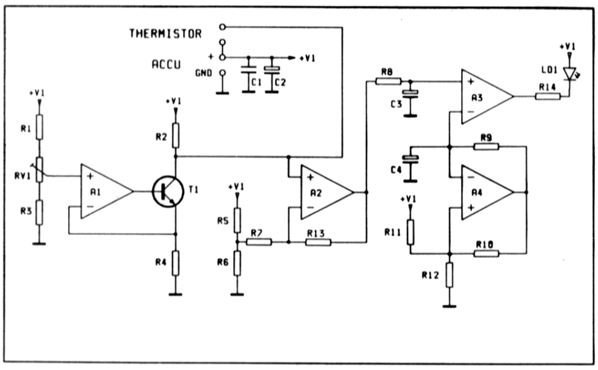
Specifications

- Power Supply : 10 - 15VDC / 25mA
- PCB Dimensions : 56 x 42mm (2.2" x 1.7")





Circuit Diagram



PCB Top View

5- ELECTRONIC WATCHDOG

دائرة انذار ضد الاصوات المزعجة

تعمل هذه الدائرة على اكتشاف الأصوات والحركات المزعجة بجوار السيارة عن طريق انبعاث صوت نباح كلب عند سماع اي ضوضاء. الجهد المستخدم ٩-١٢ فولت(تيار مستمر)، والتيار المستخدم ٥٠٠ ميلي أمبير. وتعطي الدائرة قدرة ٢ وات مع السماعة ٤ اوم .

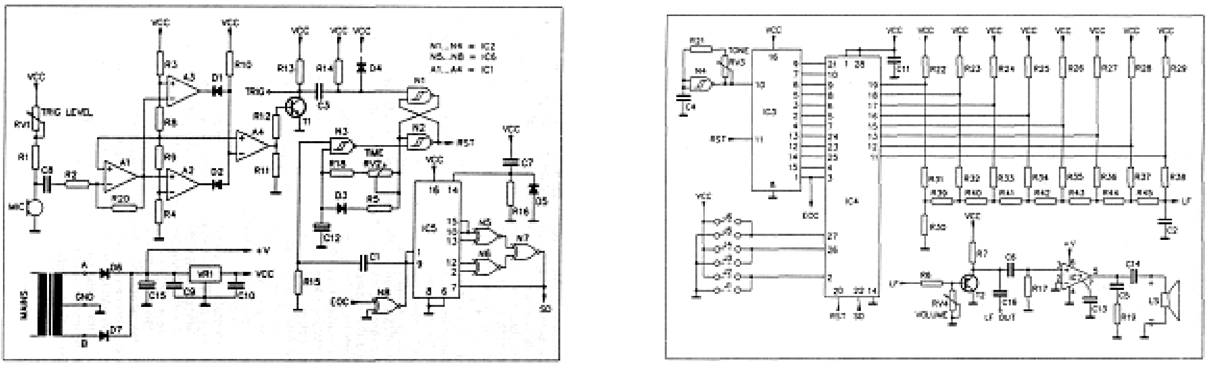
A circuit that produces a natural sounding barking dog with a sensitive "ear" to everything that comes near it. It is a faithful watchdog, which never sleeps and never has to be taken out for a walk.

Specifications

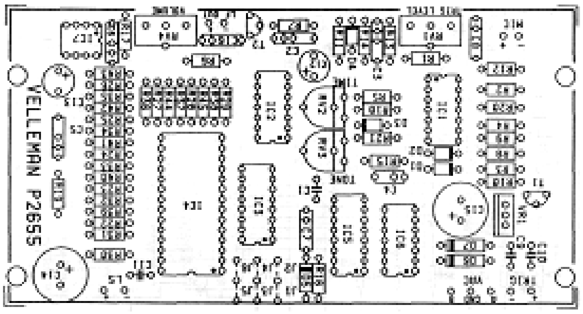
- Power Supply : 2 x 8VAC or 9 - 12VDC / 500mA
- Choice of Two Different "dog sounds"
- Reacts to Surrounding noise with adjustable sensitivity
- speaker Output : 2W at 4ohm
- PCB dimensions : 142 x 75mm (5.6" x 3.0")

Hints

- If bark frequency is to low (very slow bark) reduce de value of C3 (ex. 1500pF).
- If microphone is too sensitive, lower the value of R20 and increase the value of R2.
- If there is a metallic background noise, put a 33pF capacitor from pin 7 of IC3 to ground.



Circuit Diagram



PCB Top View

6- MULTIFUNCTION CAR INTERIOR ILLUMINATION

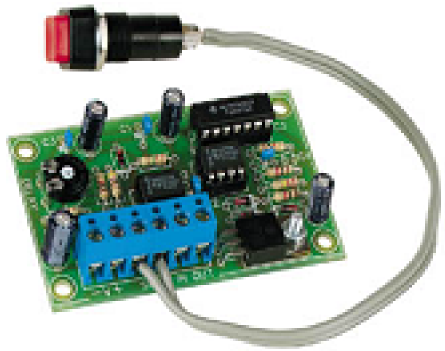
دائرة توقيت للاضاءة الداخلية للسيارة

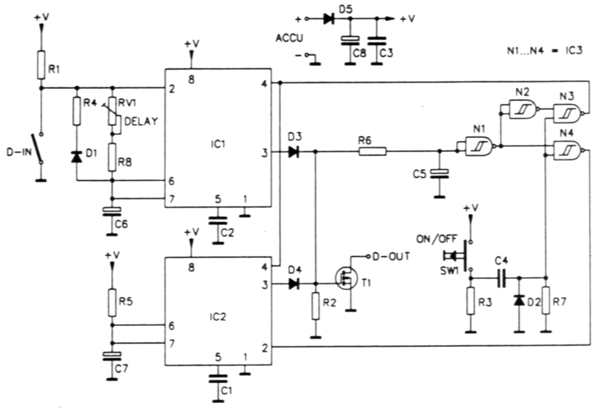
تعمل هذه الدائرة كميقاتى للاضاءة الداخلية للسيارة، ومن الممكن ادارة الاضاءة وايقافها من نفس المفتاح الضاغط. زمن الدائرة من ٠ – ٦٠ ثانية.

If, like most of us, you do not have infrared eyesight, then at times you have probably found yourself fumbling for the ignition switch or seat belt in the dark. For people like you we have developed this solution, our car interior illumination unit. With extra control and battery protection.

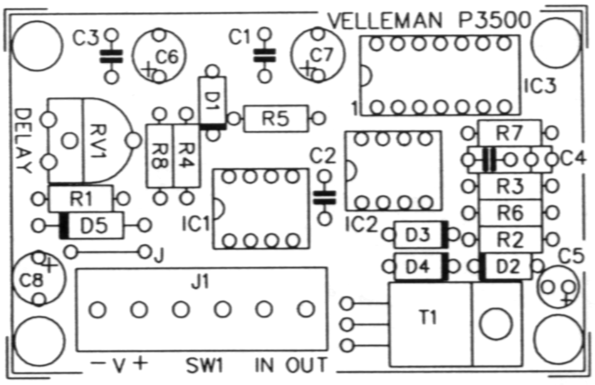
Specifications

- Switch-Off Delay : adjustable for 0 to 60 seconds
- Power Consumption : 13mA
- PCB Dimensions : 45 x 70mm (1.8" x 2.8")





Circuit Diagram



PCB Top View

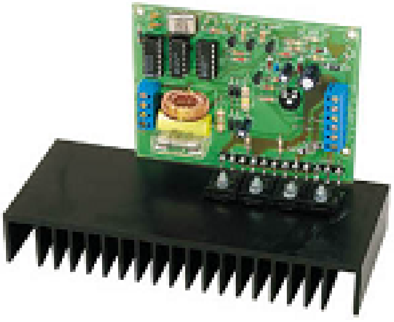
7- 12V OR 24VDC TO 220VAC CONVERTER

دائرة لتحويل التيار المستمر(١٢ – ٢٤ فولت) الي تيار متردد (٢٢٠ فولت)

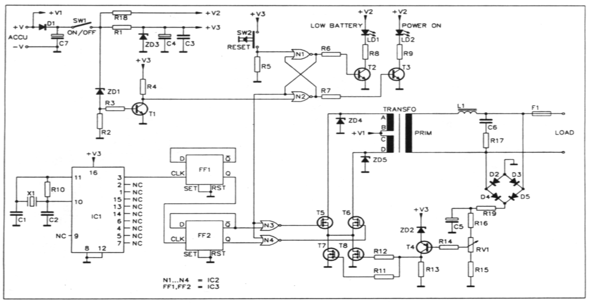
تعتمد هذه الدائرة علي فكرة تقطيع التيار المستمر عن طريق ترانزستورات تأثير المجال ثم رفعها بواسطة محول الى القيمة المطلوبة للتيار المتردد. اقصي قدرة ١٦٠ وات (عند استخدام ١٢ فولت) و ٣٠٠ وات (عند استخدام ٢٤ فولت).

For use in cars, trucks, boats, caravans or other places where only 12 or 24 volt battery power is available. For supplying audio equipment, video recorders, television, computer, electric shaver, etc.

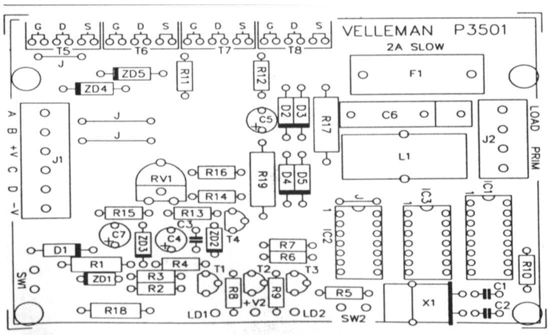
Specifications



- 300W output power at 24VDC input
- 160W output power at 12VDC input
- 50Hz crystal oscillator
- FET Power Transistor (heat sink included)
- Output voltage monitor
- Battery Voltage monitor
- Quiescent current : 0.5A
- Not suitable for motors
- Transformer available separately (for 12 or 24V)
- PCB dimensions : 82 x 110mm (3.2" x 4.3")



Circuit Diagram



PCB Top View

8- PARKING RADAR

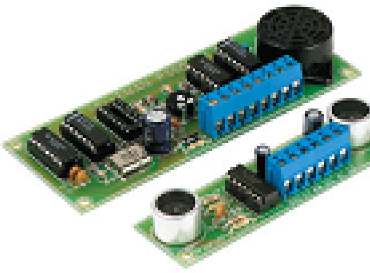
دائرة رادار تستخدم في اماكن الانتظار

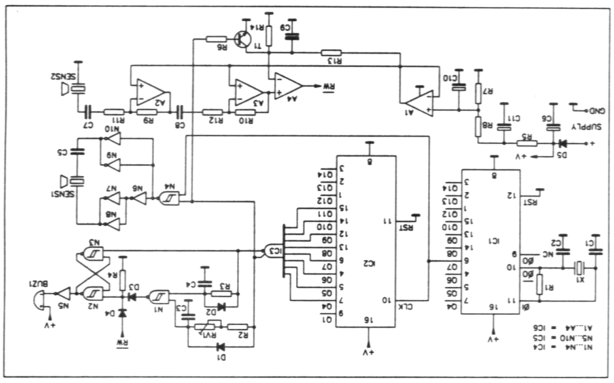
تعمل الدائرة بفكرة ارسال واستقبال الموجات فوق الصوتية المستخدمة لتفادى التصادم بين السيارات فى حالة الانتظار، وفى حالة دخول جسم فى مجال الاستقبال، تعطى الدائرة انذار على شكل صفير مع امكانية تركيب نوع آخر من الانذار. الجهد المستخدم ١٠-١٥ فولت، التيار المستخدم ١٦ ميلي امبير.

If you have problems parking then this kit is for you. Using (ultrasonic) sound waves, whose frequency is beyond our range of hearing, we can "measure" a distance. Consequently, a sensor mounted at the back of the car can give an indication of the distance between your car and the car parked behind you or other obstacles (only at the same height as the sensor). When the preset minimum distance is crossed, an audible signal is generated.

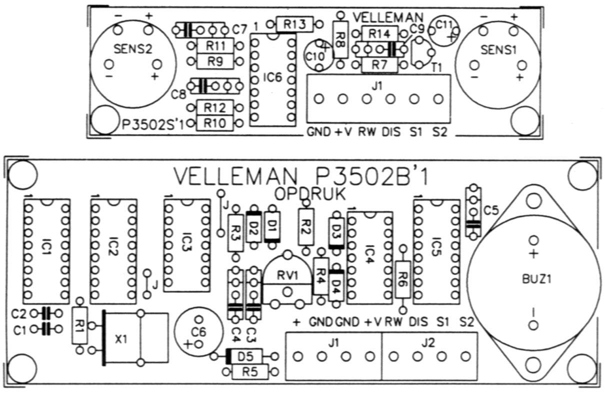
Specifications

- Detection Range : 5cm - 1.5m (adjustable)
- Detection Angle : 5°
- Supply Voltage : 10 - 15VDC / 16mA
- PCB Dimensions :
- Sensor : 28 x 95mm (1.1" x 3.7")
- Base : 48 x 125mm (1.9" x 4.9")





Circuit Diagram



PCB Top View

9- CAR BOOSTER 2 X 100W

مكبر صوتي للسيارة بقدرة ١٠٠وات ستريو

بواسطة الدائرة يمكنك اخيرا أن تقوم بتكبير صوت كاسيت السيارة بقدرة ١٠٠ وات ستريو، الجهد المستخدم ١٠-١٦ فولت، القدرة ٢ * ١٠٠ وات.

At last a kit that enables you to build an affordable high power amplifier for your car. Thanks to its universal connections, this power amplifier may be connected to any equipment. For trucks, it can be adapted to be supplied from a 24V source. Complete with heat sink and housing.

Specifications

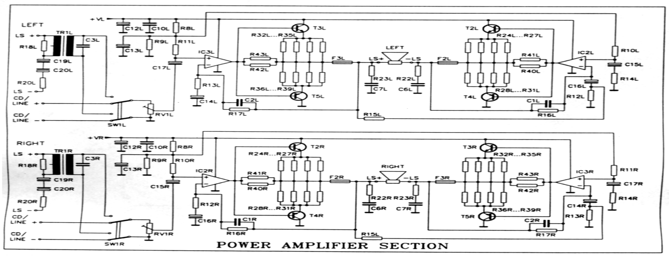
- Output Power : 2 x 100W max.
- Power Supply : 14.3VDC (10 - 16VDC allowed) / adjustable to 24VDC (20 - 30VDC allowed)
- Double switched mode power supply (PWM) with MOSFET transistors

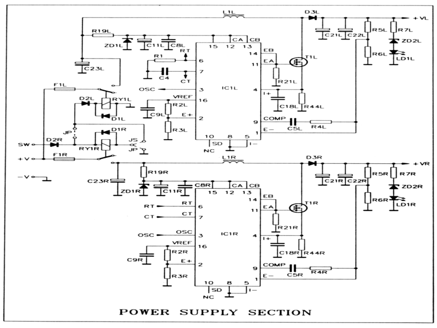
CD/LINE/LS input, selectable

- Frequency Response : 10Hz - 100KHz (CD input)
- Input Impedance : 47K or 135ohm
- Supplied with housing
- Dimensions : 250 x 190 x 50mm (9.8" x 7.5" x 2.0")

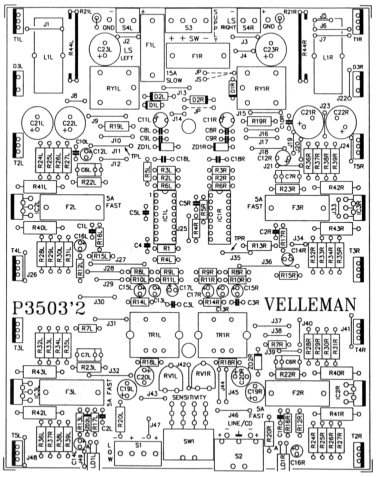
Hints

- In case of noise when using the line input : when using the line input use a line isolation transformer, or replace R18L and R18R by an 1K type and use the speaker input as line input.





Circuit Diagram



PCB Top View

10- CAR ALARM

دائرة انذار للسيارة

هذه الدائرة تحمى السيارة ومحتوياتها من السرقة بواسطة اكتشاف سحب الجهد من بطارية السيارة ، وذلك اما يكون ناتجا عن مفتاح الادارة (CONTACT) أو يكون ناتجا عن الاضاءة الداخلية للسيارة. جهد التشغيل المستخدم ١٢ فولت. زمن الدائرة ٦٠ ثانية مع خاصية الإيقاف الذاتي.

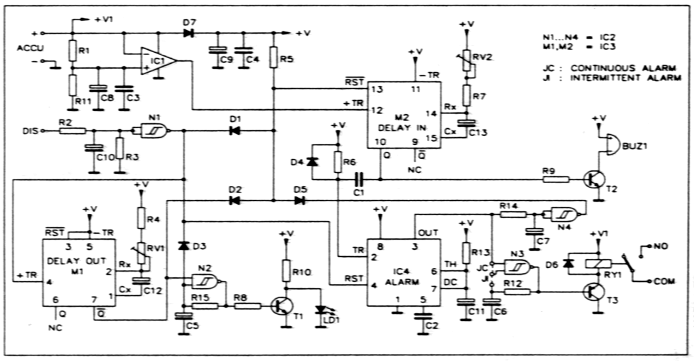
The alarm detects sudden voltage drops of the battery when the interior, trunk, or hood lights are switched on. To ensure correct operation, a number of control indications have been included, such as : flashing LED to indicate that the alarm is in standby mode after a set time (after you have left the car). Pre-alarm (built-in buzzer) to indicate that the alarm is activated, so that you will not forget to switch it off. The alarm is easy to switch on and off, either automatically or by means of the ignition switch or a remote control unit.

Specifications

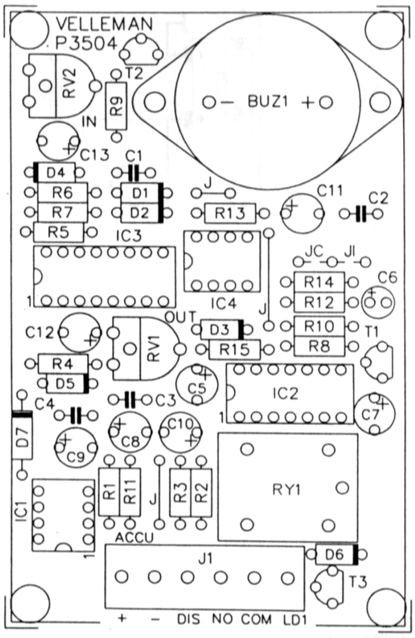
- Detects Voltage drops of the battery
- Entry Delay Time : 2 to 30 seconds with buzzer indication
- Exit Delay Time : 2 to 180 seconds with LED indication
- Alarm Period : 60 seconds with automatic reset
- Power Supply : 12V
- Standby Current : 25mA
- Relay Output : 5A
- PCB dimensions : 62 x 100mm (2.4" x 3.9")

Hints

To make the detection more sensitive replace R1 with a lower value (470ohm ... 100ohm).



Circuit Diagram



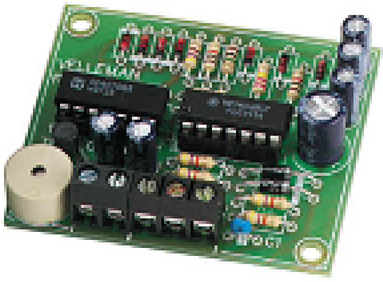
PCB Top View

11- CAR LIGHT WARNING ALARM

دائرة انذار لإضاءة السيارة

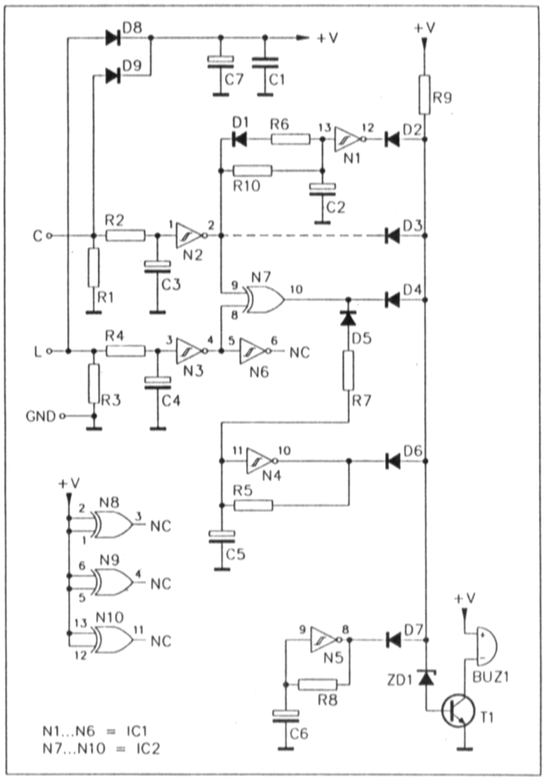
تعمل هذه الدائرة على التأكد من عمل الاضاءة الاساسية للسيارة. عندما يعمل الانذار تتذبذب الاضاءة بشكل منتظم ومستمر، وعند اغلاقه تتذبذب الاضاءة لبضع مرات فقط. جهد التشغيل المستخدم ١٢ فولت.

This head light indicator may be set for one or two functions. To indicate that the head lights (or the side lights) should be switched off after switching off the ignition contact (battery protection). Or to indicate that the head lights should be on once ignition contact is switched on (obligatory in some countries).
continuously repeated alarm tone for lights ON (may be disabled)
repeated alarm tone for lights OUT
only 3 wires are required for hook-up

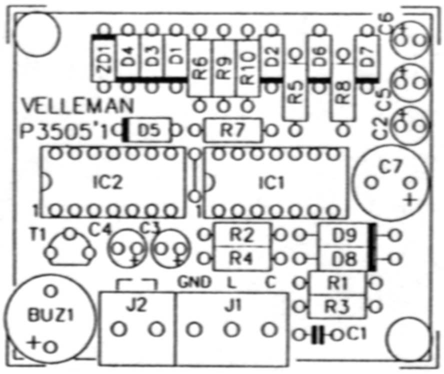


Specifications

- Supply Voltage : 12V battery
- PCB Dimensions : 48 x 57mm (1.9" x 2.2")



Circuit Diagram



PCB Top View

12- ANTI SPEAKER PLOP FOR CAR BOOSTER

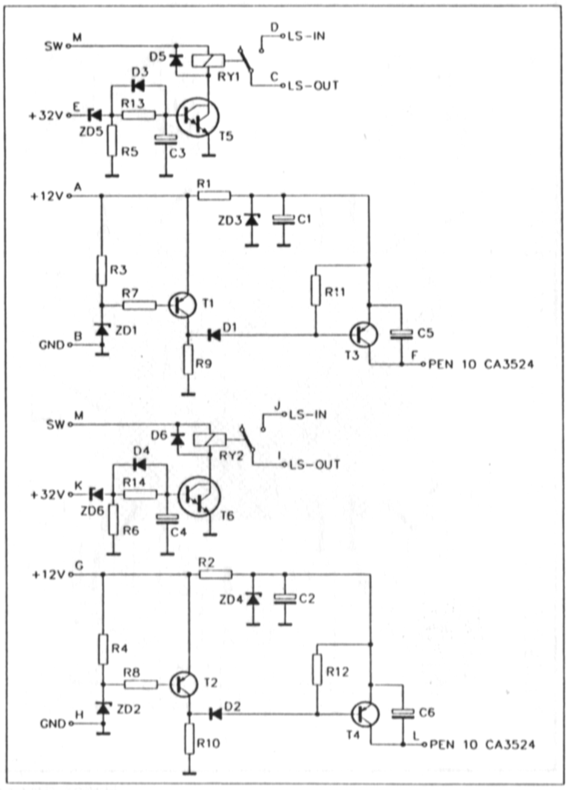
دائرة لتلافي الشوشرة اثناء فتح وغلق مكبر صوت كاسيت السيارة

هذه الدائرة تعمل علي عمل توزيع سليم للاصوات عالية التردد لمكبر الصوت الخاص بالسيارة. جهد التشغيل المستخدم ١٠ فولت.

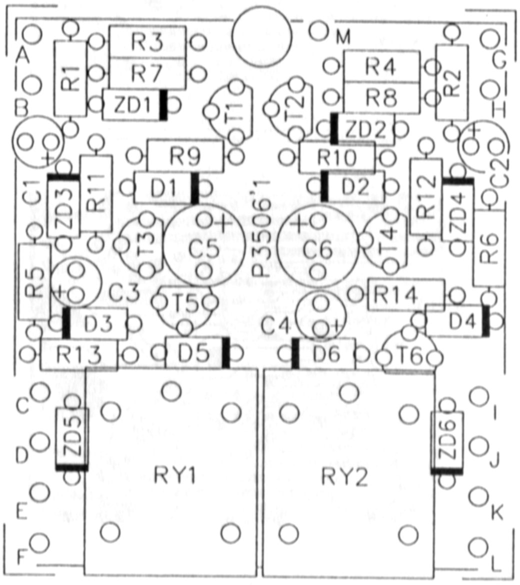
Prevent any annoying plop occurring in speakers when switching the car booster on and off. In addition, it provides protection for the MOSFET transistors and the car battery (monitoring the voltage drop). The entire circuit can be built into the car booster housing.

Specifications

- Soft start of the switched mode power supply
- Switch-on delay of the speakers : ± 2 seconds
- Immediate switch-off of the speakers
- When switching off the booster
- Voltage monitor : switch off at +/- 10V
- Only suitable for VELLEMAN K3503 2 X 100W car booster
- PCB dimensions : 57 x 51mm (2.2" x 2.0")
- When protection works to early due to voltage drop of the battery, please change ZD1 and ZD2 by 9.1 or 8.2V type.
- When the power supply is not stable, change C5 and C6 by 47µF.



Circuit Diagram



PCB Top View

13- 250W 24VDC TO 220VAC INVERTER

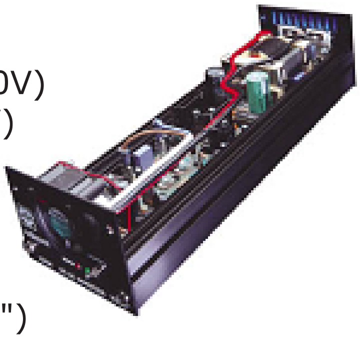
محول من ٢٤ فولت تيار مستمر الى 220 فولت تيار متردد

محول من ٢٤ فولت تيار مستمر الى ٢٣٠ فولت تيار متردد بقدرة ٢٥٠ وات. ومن مميزاتها ان حجمها خفيف (١,٤ كجم) ولذلك تستخدم اثناء السفر والتجوال.

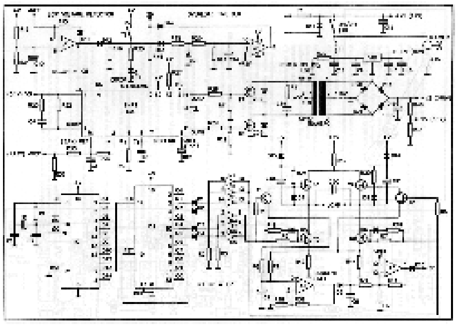
Very compact considering the continuous power of 250W. Light weight (1.4kg, 3.1 lb) and therefore perfectly suitable as travel luggage. Automatic shut-off if battery power is too weak. Electronically protected against short circuit and overload. May start up on short term overloads when connecting difficult loads, such as television, drill, computer, etc. High efficiency and low consumption in case of no-load (0.2A). Fuse protection. Not suitable for refrigerators.

Specifications

- Input Voltage : 20.5 to 28VDC
- Maximum Current consumption : 13A
- Output Voltage : 230VAC (-10%) (possibility of 110V)
- Continuous output power : 250W (150W with 110V)
- Peak Output power : 500W
- Output Frequency : 50Hz crystal quartz
- (possible 60Hz frequency)
- Output voltage wave : modified sine wave
- Dimensions : 270 x 60 x 85mm (10.6" x 2.4" x 3.4")
- When problems during low temperature operation, use LM224 instead of LM324 for IC5.



Circuit Diagram



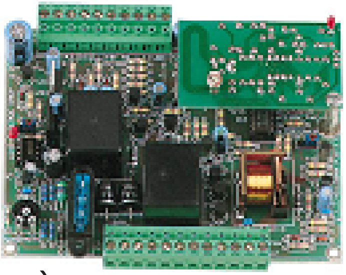
PCB Top View

14- REMOTE CONTROLLED CAR ALARM SYSTEM (RF)

دائرة انذار للسيارة بالتحكم عن بعد (ترددات الراديو)

نظام انذار للسيارة مزود بمتحكم عن بعد (ريموت كونترول) يعمل عن طريق استخدام ترددات الراديو، تمتاز الدائرة بانها يمكن تشغيلها مع الكثير من انظمة الكواشف بالإضافة الي دائرة الانذار فإن الريموت كونترول يمكنه التحكم في فتح وغلق ابواب السيارة عن بعد.

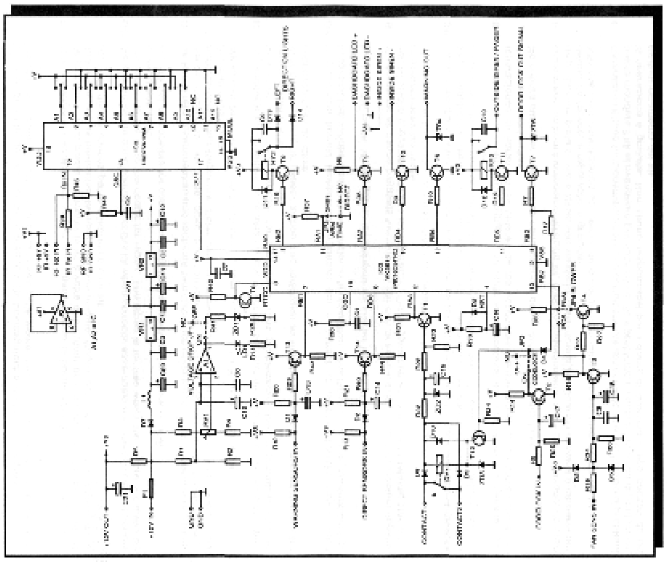
This outstanding car alarm is full of potential, able to connect up with and operate a variety of sensors. In addition, the remote control facility (RF) allows the central locking system to be operated together with the alarm.

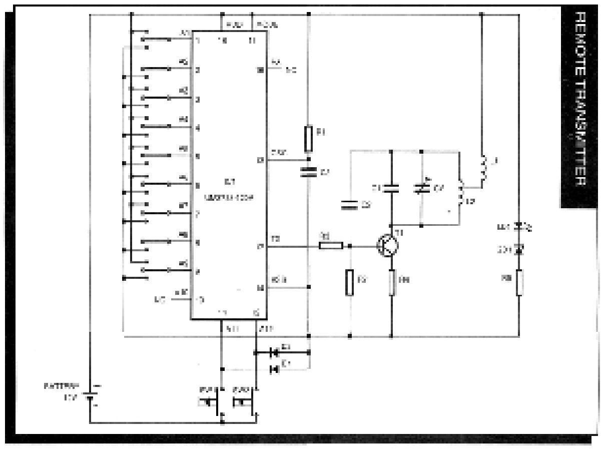


Features

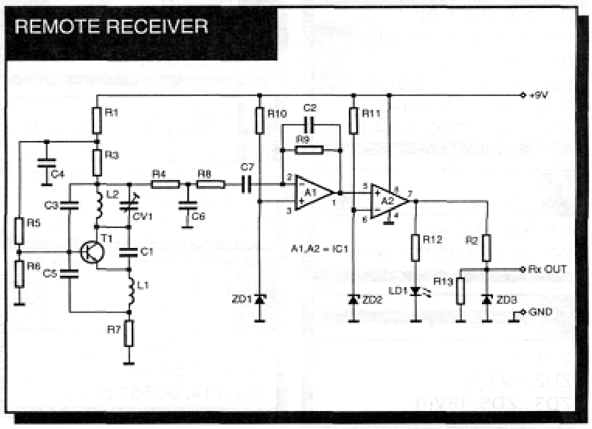
- Microprocessor technology
- Multi-functional remote control operation
- Audio and visual on/off indicators
- Multifunction dashboard mounted LED
- Automatic reset after alarm
- Adjustable voltage drop (reaction to interior lighting)
- Voltage drop detection active immediately, or after 5 minutes
- Direct alarm trigger input (direct alarm after triggering)
- Warning alarm trigger input (2 triggers within 15 seconds = alarm)
- Warning input can be switched off with the remote control
- Adjustable shock detector (can be switched off with the remote control)
- Detector input for ventilator in order to avoid false alarms
- Contact switches for bonnet and boot
- Internal siren for on/off signal and alarm
- Output for external siren and pager (5A)
- Alarm time : 30 seconds
- Starter interrupter for ignition or diesel fuel pump (15A)
- Special starter motor interrupter relay (30A) supplied
- Switch on protection if contact is on
- Output to hazard lights (2 x 6A max.)
- Output for central locking (100mA)
- Selectable code for remote control transmitter and receiver (8.748 codes)
- An unlimited number of remote control transmitters can be used (**{** HYPERLINK "http://www.velleman.be/product.asp?id=343922" **}** or **{** HYPERLINK "http://www.velleman.be/product.asp?id=343923" **}**)
- Automatically resets in the event of accidental switch off (60 seconds)
- Connection for extra starter interrupter via security code lock module (**{** HYPERLINK "http://www.velleman.be/product.asp?id=15932" **}**)
- Diagnosis facility to identify a triggered sensor at a later time
- Supply voltage : 12VDC
- Consumption : 50mA in standby
- Temperature range : -40 to +85°C

Circuit Diagrams



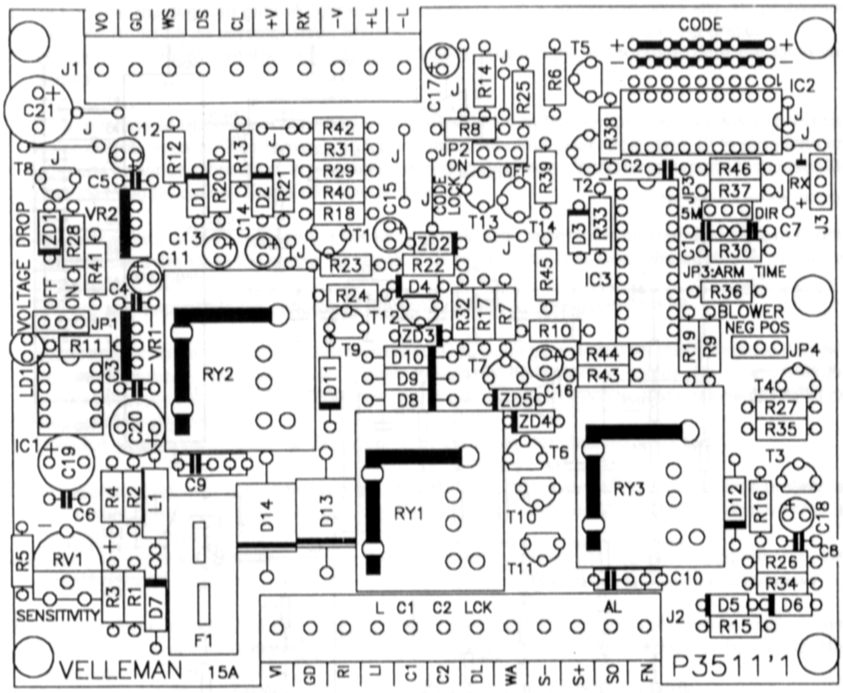


REMOTE TRANSMITTER



REMOTE RECEIVER

PCB Top View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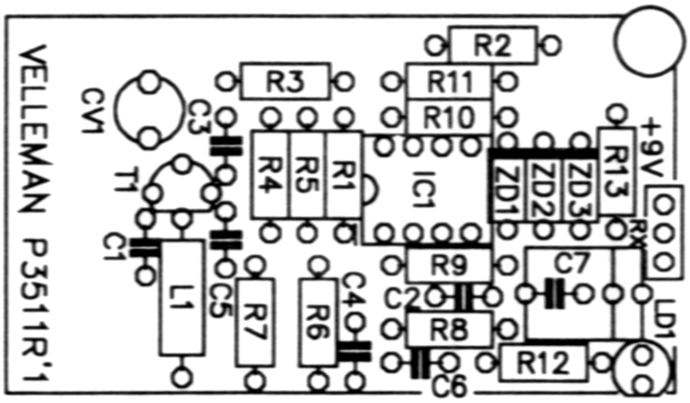
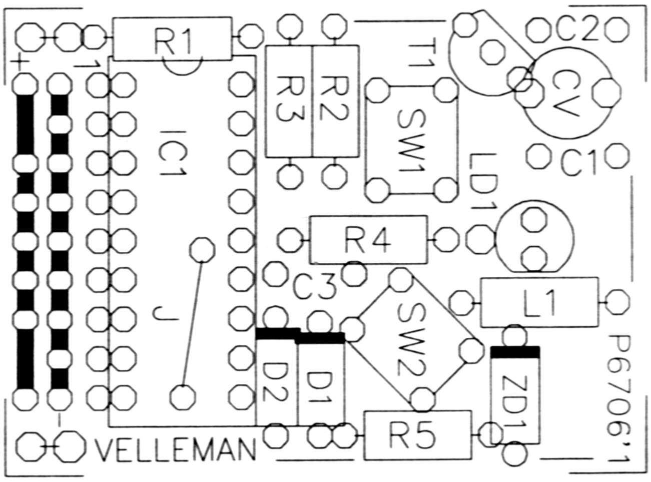
GD
WS
DS
CL
+V
RX
-V
+L
-L
J1
CODE
IC2
C21
C12
R12
R20
R13
R21
R42
R31
R29
R40
R18
D1
D2
C14
C15
C17
R14
R25
R6
T5
R8
JP2
ON
OFF
CODE LOCK
R38
R39
T13
T14
T2
C2
R46
R37
RX
J3
DIR
C7
5M
JP3
R30
JP3:ARM TIME
R36
BLOWER
NEG POS
JP4
T8
C5
VR2
ZD1
R28
R41
VOLTAGE DROP
OFF
ON
JP1
R11
LD1
C4
C3
VR1
C13
C11
T1
ZD2
R23
R22
D4
R24
R32
R17
R7
R45
D3
R33
IC3
R10
R19
R9
RY2
T12
ZD3
T9
D10
D9
D8
D11
T7
R44
R43
C16
ZD5
ZD4
T6
T4
R27
R35
IC1
C19
C20
C9
R4
R2
L1
C6
D14
D13
RY1
RY3
T3
D12
R16
C18
CB
T10
T11
R5
RV1
SENSITIVITY
R3
R1
D7
F1
15A
C10
R26
R34
L
C1
C2
LCK
AL
J2
D5
D6
R15
VELLEMAN
P3511'1
VI
GD
RI
LI
CI
C2
DL
WA
S-
S+
SO
FN


VELLEMAN P3511R'1
CV1
C3
T1
C1
L1
C5
R3
R4
R5
R1
R7
R6
C4
R2
R11
R10
IC1
R9
C2
R8
C6
ZD1
ZD2
ZD3
R13
+9V
RX
C7
R12
LD1

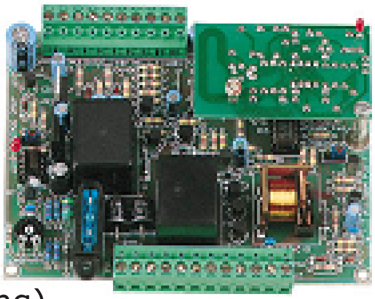

+
-
1
R1
IC1
J
R3
R2
T1
SW1
C2
CV
C1
LD1
R4
C3
SW2
L1
D2
D1
ZD1
R5
VELLEMAN
P6706'1

15 REMOTE CONTROLLED CAR ALARM SYSTEM (IR)

دائرة انذار للسيارة بالتحكم عن بعد (بالاشعة تحت الحمراء)

نظام انذار للسيارة مزود بمتحكم عن بعد (ريموت كونترول) عن طريق استخدام الاشعة تحت الحمراء، تمتاز الدائرة بانها يمكن تشغيلها مع الكثير من انظمة الكواشف (Sensors)، بالإضافة الي دائرة الانذار فإن الريموت كونترول يمكنه التحكم في فتح وغلق ابواب السيارة عن بعد.

This outstanding car alarm is full of potential, able to connect up with and operate a variety of sensors. In addition, the remote control facility (IR) allows the central locking system to be operated together with the alarm.



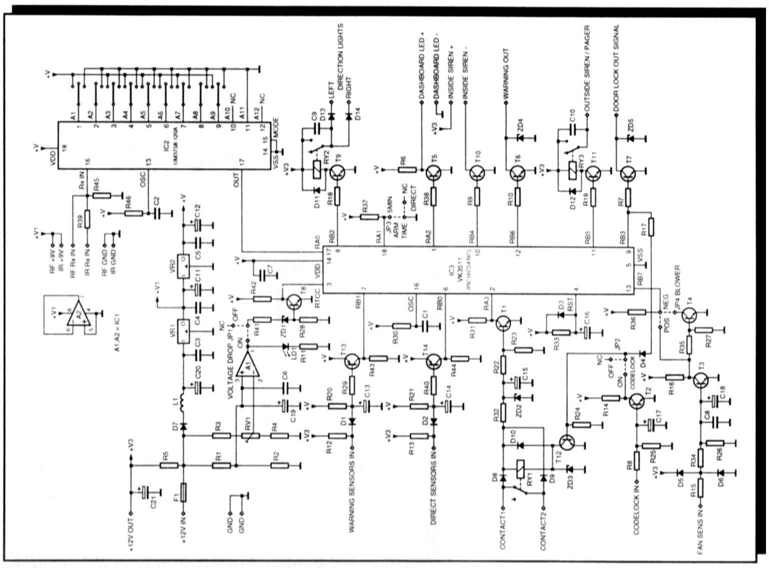
Features

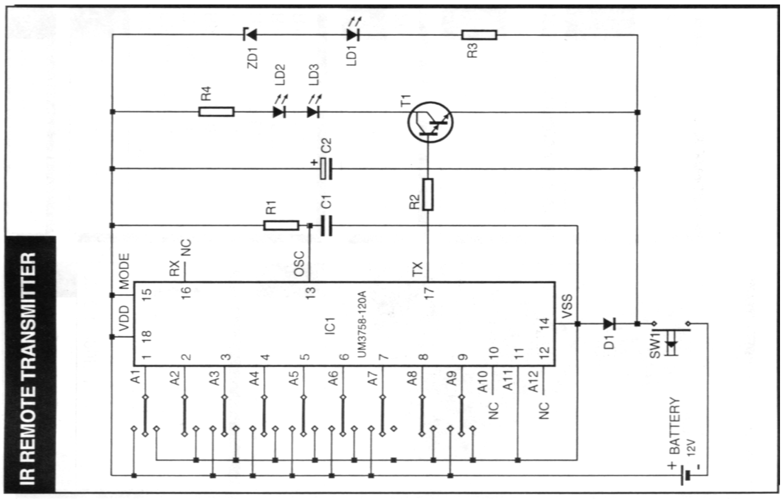
- Microprocessor technology
- Multi-functional remote control operation
- Audio and visual on/off indicators
- Multifunction dashboard mounted LED
- Automatic reset after alarm
- Adjustable voltage drop (reaction to interior lighting)
- Voltage drop detection active immediately, or after 5 minutes
- Direct alarm trigger input (direct alarm after triggering)
- Warning alarm trigger input (2 triggers within 15 seconds = alarm)
- Warning input can be switched off with the remote control
- Adjustable shock detector (can be switched off with the remote control)
- Detector input for ventilator in order to avoid false alarms
- Contact switches for bonnet and boot
- Internal siren for on/off signal and alarm
- Output for external siren and pager (5A)
- Alarm time : 30 seconds
- Starter interrupter for ignition or diesel fuel pump (15A)
- Special starter motor interrupter relay (30A) supplied
- Switch on protection if contact is on
- Output to hazard lights (2 x 6A max.)
- Output for central locking (100mA)
- Selectable code for remote control transmitter and receiver (8.748 codes)
- An unlimited number of remote control transmitters can be used (**{** HYPERLINK "http://www.velleman.be/product.asp?id=9344" **}**)
- Automatically resets in the event of accidental switch off (60 seconds)

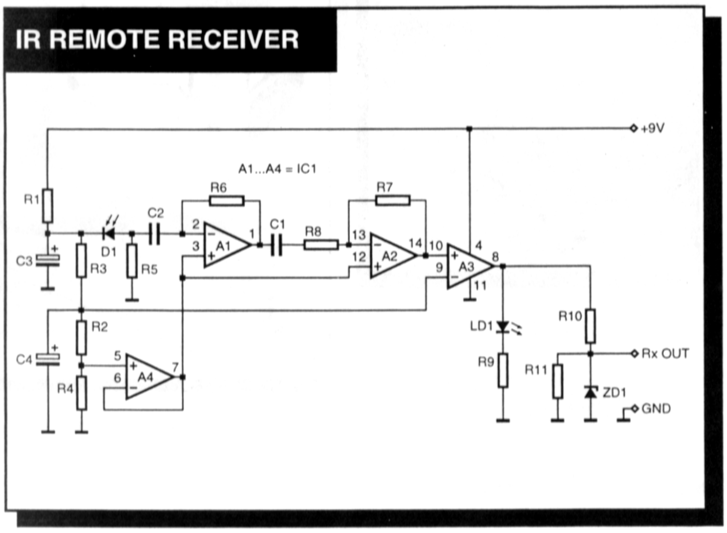
connection for extra starter interrupter via security code lock module (**{** HYPERLINK "http://www.velleman.be/product.asp?id=15932" **}**)

- Diagnosis facility to identify a triggered sensor at a later time
- Supply voltage : 12VDC
- Consumption : 50mA in standby
- Temperature range : -40 to +85°C
- Battery for remote control unit : 12V type **{** HYPERLINK "http://www.velleman.be/product.asp?id=347368" **}**, V23A

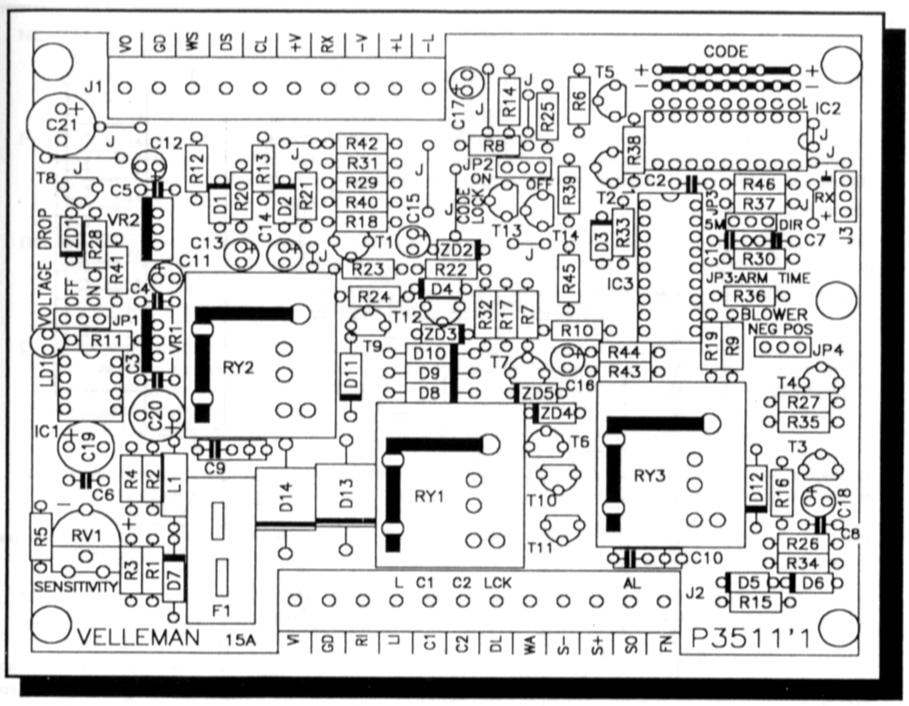
Circuit Diagrams

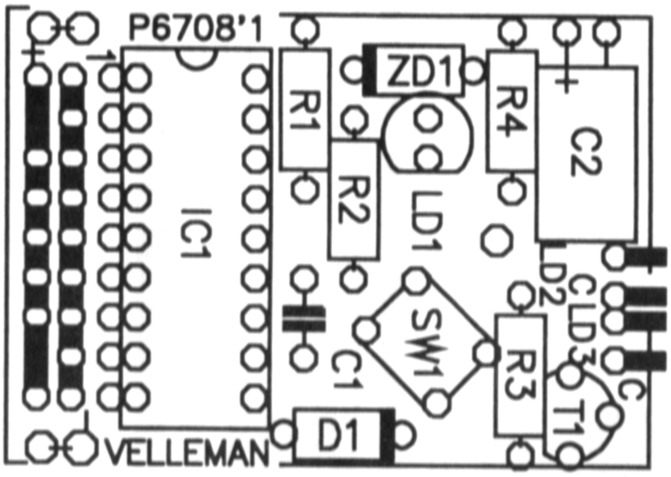


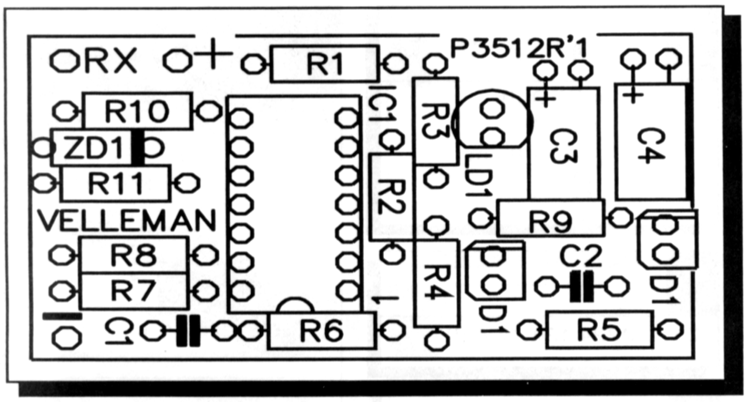

IR REMOTE TRANSMITTER


IR REMOTE RECEIVER

PCB Top View


VO GD WS DS CL +V RX -V +L -L
J1
CODE
T5
IC2
C21
C12
R42 R31 R29 R40 R18
R14 R25 R6
C17
R8
JP2 ON OFF
CODE LOCK
R38
T8
C5
R12 R20 R13 R21
D1 D2
C14 C15
T13 T14 T2
R39
C2
R46 R37
RX
J3
VOLTAGE DROP
ZD1 R28 R41
VR2
C13 C11
T1
ZD2
D3 R33
5M
C1
C7
DIR
R30
JP3:ARM TIME
R36
BLOWER
NEG POS
JP4
OFF ON
JP1
C4
VR1
R23 R22
R24 D4
R32 R17 R7
R45
IC3
R10
T12
ZD3
T9
D10 D9 D8
T7
R44 R43
R19 R9
RY2
D11
ZD5
C16
ZD4
T4
R27 R35
LD1
R11
C3
C20
IC1
C19
C9
T6
RY1
RY3
T3
R4 R2 L1
C6
D14 D13
T10
D12 R16
C18
C8
R5
RV1
R3 R1
D7
T11
R26 R34
C10
SENSITIVITY
F1
L C1 C2 LCK
AL
J2
D5 D6
R15
VELLEMAN
15A
VI GD RI LI CI C2 DL WA S- S+ SO FN
P3511'1


P6708'1
ZD1
R1
R4
C2
IC1
R2
LD1
LD2
C
LD3
C
SW1
C1
R3
T1
C
D1
VELLEMAN


RX
R1
P3512R'1
R10
IC1
R3
C3
C4
ZD1
LD1
R11
R2
VELLEMAN
R9
R8
C2
D1
R7
R4
LD1
C1
R6
R5
1

16- CODE LOCK

دائرة اغلاق بالشفرة

تعمل الدائرة بفكرة تشغيل مفتاح الكترونى عن طريق شفرة مكونة من أربعة أرقام بالتتابع، مع ملاحظة ان زمن فتح البوابة لا يزيد عن خمس ثوان ثم يتم اغلاقه اوتوماتيكيا. الجهد المستخدم ٩-١٢ فولت (تيار عادي).

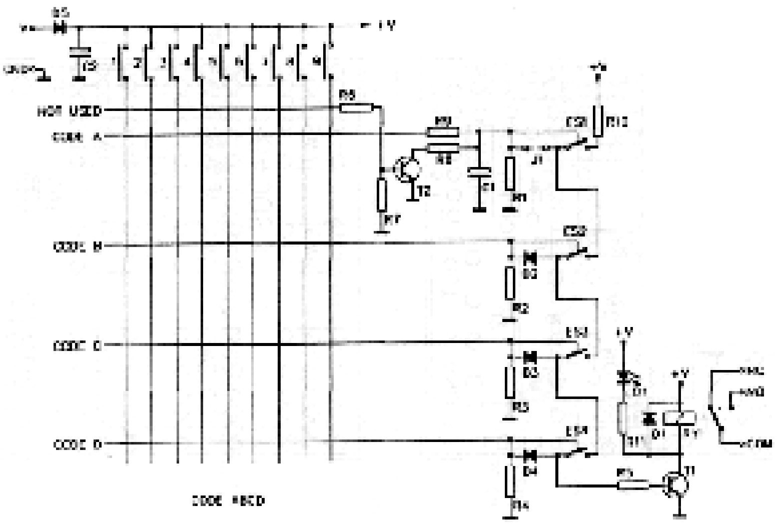
This code lock may be used to switch an alarm (e.g. car alarm **{** HYPERLINK "http://www.velleman.be/product.asp?id=9151" **}**) on and off, or to open a door lock. An LED on the operating panel indicates the position of the 'lock'. The code is easy to define. Because the operation panel is completely enclosed, it may be used inside and outside the house.

Specifications

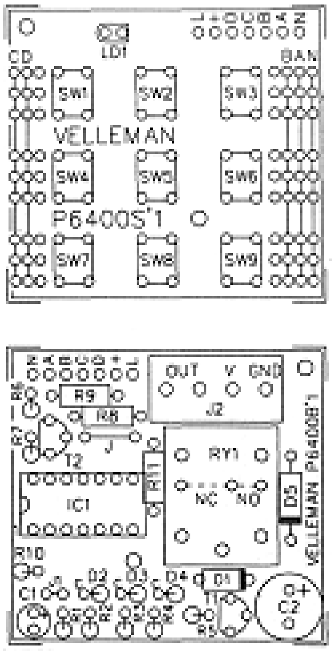
- More than 3000 codes (4 digits)
- Relay output : 5A / 220V
- Time limit for code entry : ± 5 seconds
- Power supply : 9 - 15VDC or 8 - 12VAC
- Power consumption :
- Output on : 40mA
- Output off : 0.3µA
- Dimensions : front panel : 80 x 80mm (3.2" x 3.2"), depth : 40mm (1.6")

Hints

- If not already mentioned replace R8 with a 10ohm type.



Circuit Diagrams



PCB Top View

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ALARMS AND INDICATORS

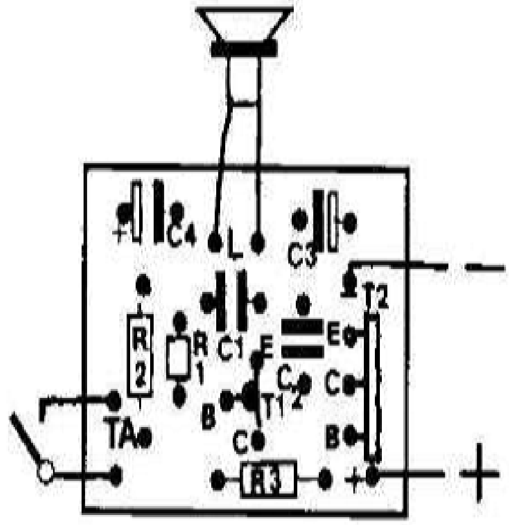
A-KEMO CIRCUITS

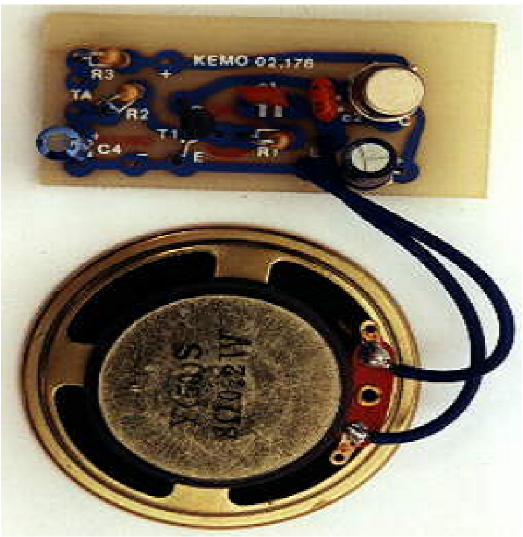
1- Siren max. 1 Watt, 3...9V--Air-raid siren No. B010 دائرة سرينه ١ وات

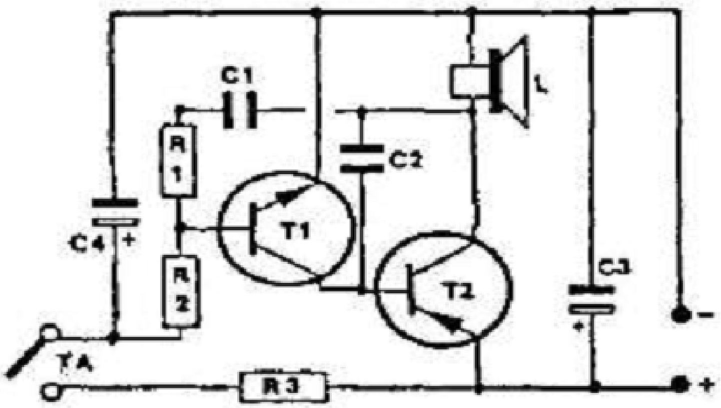
دائرة إنذار غارة جوية بقدرة ١ وات وجهد تشغيل من 3V إلى 9V ولكن في حالة تشغيل الدائرة على جهد أعلى من 4.5V لابد من تبريد الترانزيستور T2 . بعد توصيل مصدر الجهد لابد من توصيل المفتاح TA بمفتاح ضاغط (Push-button) أو ب relay للتحكم فيه من بعد. عند غلق طرفي التوصيل TA تبدأ الدائرة في تشغيل صوت الإنذار بمستوى منخفض ثم يرتفع تدريجيا. و عند فتحهما يقل مستوى الصوت تدريجيا.

Loud siren with increasing and decreasing sound. Perfect for model making, Complete with loudspeaker

In case the siren is operated with a voltage higher than 4.5V (max. 9V), the transistor T2 must be cooled with a heat sink (not included in the kit). After feeding the operating voltage the contact TA must be either connected with the push-button or by a relay of the remote control. If the contact TA is closed, the siren begins slowly to wail, if the contact is then opened again the sound decays slowly. If the loudspeaker is installed in a housing with hearing tube, the sound is much louder because of the resonance.



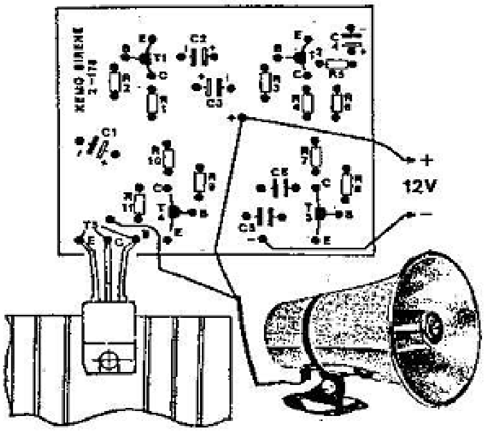


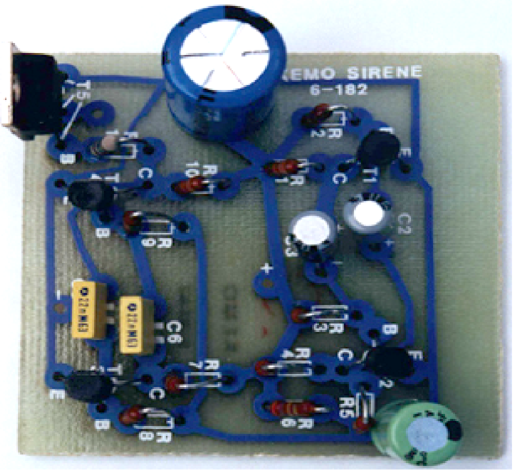


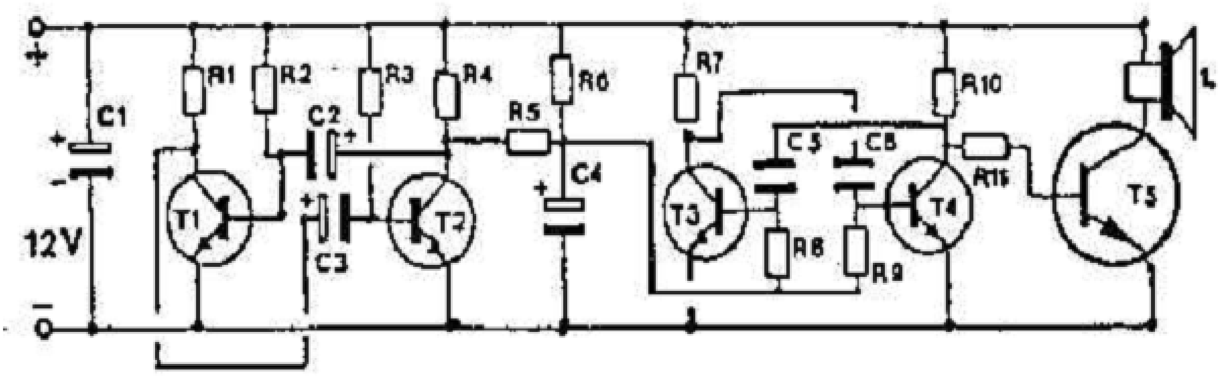
2- FBI-siren 12V 15W No. B035 سرينة المباحث الفيدرالية الأمريكية

جهد التشغيل للدائرة 12V وتستخدم مع السماعات من ٨ اوم إلى ٣٢ اوم وتعطي خرج من ٣ وات إلى ١٥ وات بناءا على مقاومة السماعة وتعطي ١٥ وات مع السماعة ٨ اوم .

Audible electronic siren with a tone of the American police siren. Operating voltage: 12V.
For loudspeaker 8...32 Ohm. Power 3...15 Watt, depending on the loudspeaker.
Please take special care that you carry out correct equipment of the printed board. The siren will achieve at an 8 Ohm loudspeaker max. 15 Watt. In case this high volume won't be required, it is possible to use any loudspeaker with a higher impedance. With a 16 Ohm loudspeaker the siren will achieve approx. 7 Watt, with a 32 Ohm loudspeaker e.g. 4 Watt. It is feasible to connect several loudspeakers in series, e.g. to increase the impedance. (2 loudspeakers each with 4 Ohm connected in series will show a total connecting impedance of 8 Ohm). Furthermore, it is feasible to connect in series with a wire wound resistance of 4...100 Ohm a loudspeaker, in order to reduce the volume. The siren has, depending on the loudspeaker impedance, a current consumption of 0,3...2 Ampere. The current supply must, consequently, be sufficiently powerful (car-accu). Never use small dry batteries! Moreover, the loudspeaker should be prepared for the power of the siren. Too weak loudspeakers may burn out!!! The transistor T5 should be fixed with screws on a small cooling plate (approx. 10 x 10 x 0,5 cm). The cooling plate isn't enclosed in the kit. The cooling plate must be placed insulated and well ventilated (it may not touch any other conducting metal components!).







CIRCUIT DIAGRAM

3-Space siren No. B036 دائرة تنتج صوت سرينة الفضاء

دائرة سرينة الفضاء . وتعمل مع السماعات من ٨ اوم الى ٣٢ اوم . وتعطي قدرة خرج من ٣ وات الى ١٥ وات بناءا على مقاومة السماعة . وجهد التشغيل للدائرة ١٢ فولت . وعند عمل الدائرة لابد من وضع المكونات بالطريقة الصحيحة على اللوحة المطبوعة وتعطي الدائرة أقصى قدرة لها ١٥ وات عندما تكون مقاومة السماعة ٨ اوم . و مع السماعة ١٦ اوم تعطي ٧ وات .

Extremely audible, nerve-shattering siren sound with the attack alarm known from the movie "Star Wars". For loudspeaker from 8...32 Ohm.
Power: 3...15 Watt, depending on the loudspeaker.
UB: 12 Volt, 0,3...1,2 Ampere.

LAYOUT

Please take special care that you carry out correct equipment of the printed board! The siren will achieve at an 8 Ohm loudspeaker max. 15 Watt. In case this high volume won't be required, it is possible to use any loudspeaker with a higher impedance. With a 16 Ohm loudspeaker the siren will achieve approx. 7 Watt, with a 32 Ohm loudspeaker e.g. 4 Watt. It is feasible to connect several loudspeakers in series, e.g. to increase the impedance. (2 loudspeakers each with 4 Ohm connected in series will show a total connecting impedance of 8 Ohm). Furthermore, it is feasible to connect in series with a wire wound resistance of 4...100 Ohm a loudspeaker, in order to reduce the volume. The siren has, depending on the loudspeaker impedance, a current consumption of 0,3...2 Ampere. The current supply must, consequently, be sufficiently powerful (car-accu). Never use small dry batteries! Moreover, the loudspeaker should be prepared for the power of the siren. Too weak loudspeakers may burn out!!! The transistor T5 should be fixed with screws on a small cooling plate (approx. 10 x 10 x 0,5 cm). The cooling plate isn't enclosed in the kit. The cooling plate must be placed insulated and well ventilated (it may not touch any other conducting metal components)

THE CIRCUIT DIAGRAM

THE TOP AND REAL VIEW

4- Sensor Number Lock NO B037 دائرة إغلاق بشفرة

تستخدم هذه الدائرة لفتح الأبواب و البوابات آليا بدون الحاجة إلى مفاتيح وتشغيل الماكينات والأجهزة الإلكترونية والتي لابد أن يتم تشغيلها عن طريق الأشخاص المصرح لهم بذلك . فعند الضغط على الرقم الصحيح يتم غلق ال **RELAY** وتعمل الدائرة . أما إذا تم الضغط على الرقم الخاطئ تتوقف الدائرة عن العمل لفترة زمنية محددة.

Electronic "sensor" number lock. Touching the correct numbers a relay will operate. In case that false numbers are touched, the lock will block automatically for some time. The number can be preset freely. Operating voltage: 12 V.

Usage: For opening doors and gateways without keys, to switch machines and electronic devices, which should not be operated by unauthorized persons (through latching relay). For self made electric locks at safes and partition for valuables etc.

The enclosed 10 sensors heads have to be stacked according to the figure in the corresponding bore holes at the sensor keyboard on the printed circuit board. The two sensors which should open the lock, have to be joined

through short wires with both soldering spots at the right side of the reverse side of the p.c. board (in the figure we use as example the numbers "O" and "1"). Whenever these two sensors heads are touched at the same time with the fingers, the relay will pull on. You may, of course, choose any other number and comply with your favorite combination to open the lock.

All others numbers have to be joined in couples with the two soldering spots at the left side "sensors lock", achieving that the lock will block immediately for some time (approx. 30...120 seconds) whenever false sensors have been touched. During this time operating the lock is impossible, even if the right numbers are touched. By that means, it is not feasible that strange persons may find out the correct numbers simply through "testing". The board element with the sensors heads may also be sawed off and be mounted at any other place. The connections to the board should then be made with short wires.

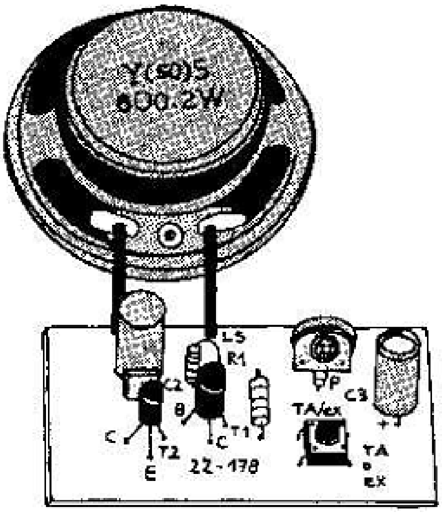
THE CIRCUIT DIAGRAM

THE TOP AND REAL VIEW

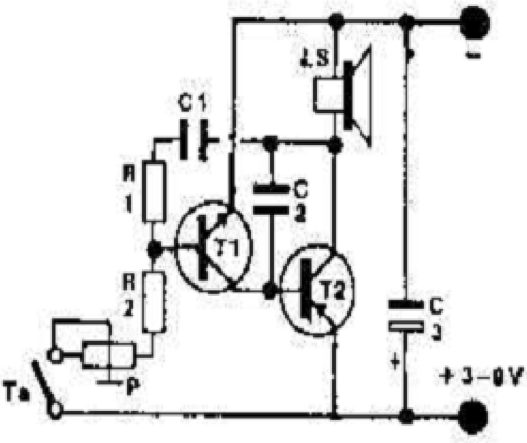
5 - SOUND GENERATOR MORSE-PRACTICE-SET

دائرة توليد شفرة مورس . تعمل بجهد تشغيل من ٣ فولت إلى ٩ فولت .هذه الدائرة من الممكن أن تستخدم كدائرة تدريب على شفرة مورس أو كدائرة إرسال مشفرة من خلال أسلاك طويلة . و قد تستخدم كجرس للباب أو جهاز قياس توصيل الأسلاك (buzzer) و يمكنه قياس التيار حتى ١٥ ميكرو أمبير لذلك فيمكن قياس الكبلات ذات المقاومة العالية .

Sound generator with loudspeaker and pushbutton as "Morse key". For 3...9 Volt operating voltage. Pitch of sound can be adjusted. This especially audible sound generator can be used as practice set for Morse signals or as direct transmitter of coded communications realized through a longer cable, or it may be used as test buzzer, doorbell or as continuity checker for electrical wirings. The test current amounts less than 15µA, so that even high-ohmic connections can be measured.
You should solder the two transistors T1 + T2 correctly into the printed circuit board Both transistors have different connecting sequences. Through the trimmer potentiometer it is feasible to tune the desired pitch of sound. Volume will increase if the loudspeaker is fitted into a case. It is possible to connect instead of the digit-switch, which has to be soldered directly on the printed circuit board, through a cable a real Morse key or a bell push (for doors). If there are connected instead of the switch two test-lead points, this sound generator may be used also as continuity checker for dead wirings. Due to the extremely low test current of less than 15µA it is possible to realize continuity checks at high-ohmic or sensitive wirings. The pitch of sound will vary with increasing ohmic volume resistances, so that they can be distinguished acoustically.



TOP VIEW



CIRCUIT DIAGRAM

6- Light Barrier 12 V No. B045 دائرة مانع ضوئى

تقوم الدائرة بفتح وغلق ال **RELAY** في الضوء والظلام (الخيال) . وتستخدم كدائرة إنذار حيث أنة عندما يقوم شخص بقطع الشعاع تقوم الدائرة بإطلاق جرس الإنذار. وللدائرة حالتي تشغيل .

١- بوضع الترانزيستور الضوئي في المكان **T** فأنة يقوم بفتح ال **REALY** في الضوء و غلقه في الظلام.

٢- بوضع الترانزيستور الضوئي في المكان **T١** فأنة يقوم بفتح ال **REALY** في الظلام و غلقه في الضوء .

وبناء على الاستخدامات المختلفة يمكن اختيار الحالة المناسبة للوظيفة. وفي حالة استخدام هذه الدائرة كمانع ضوئي (دائرة إنذار) لابد من وضع الترانزيستور في المكان **T1** مع وضع اسطوانة سوداء صغيرة علية بحيث يقع الضوء علية أفقيا من إمام سطحه الحساس للضوء وبهذه الطريقة تكون هناك حماية من السقوط الجانبي للضوء عليه. ومع وضع لمبة في الاتجاه المعاكس والتأكد من سقوط الضوء على الترانزيستور الضوئي من خلال الأنبوبة فأنه عند قطع أي شخص للضوء يقوم الترانزيستور بتشغيل الإنذار أو الإضاءة أو الجرس.....الخ .

switches on/off a relay at light and darkness(shadow). Usage: Whenever the light beam of a lamp on doors, windows, etc. is interrupted by a person, the device will release alarm. Also suitable as twilight switch.

This light barrier receiver reacts on light and darkness by switching on and off a relay. For this kit there are two operation modes:

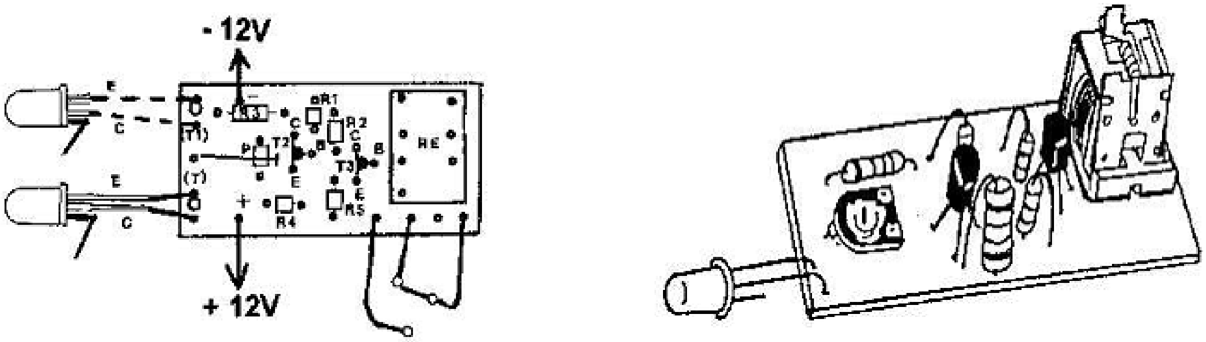
1) Connecting the phototransistor at "T", the relay will switch on with illuminated phototransistor and will switch off at darkness.

2) Connecting the phototransistor at "T1", the relay will switch on at darkness and off with light.

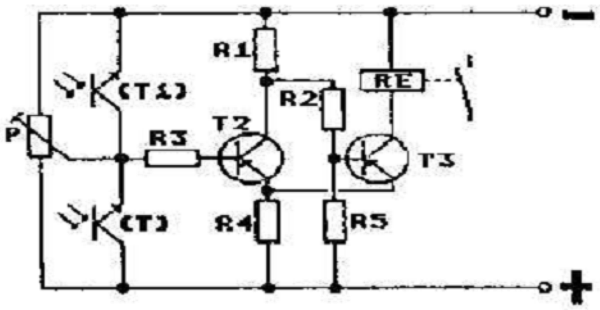
Depending on the different usages it is possible to select the most suitable mode of operation. In case of using it as light barrier e.g., it is necessary to solder the phototransistor at T1 and to fix a small black tube on the phototransistor providing that the light may fall solely horizontally from the front on the light-sensitive surface. That way, it is protected against lateral incidence of light.

Mounting now in a distance of some meters a lamp (if possible with focusing lens or reflector) achieving that the light falls directly through the tube on the phototransistor, you get a splendid door security system. The trimmer potentiometer has to be adjusted so that the relay does just not pull on.

If a person crosses the light beam, a shadow will be reflected on the phototransistor and the relay will switch on (bell, counter, etc.).



TOP AND REAL VIEW



CIRCUIT DIAGRAM

7- Gas Sensor / Spirits tester No. B051 دائرة إنذار ضد الغازات والحريق

هذه الدائرة تستطيع أن تبين وجود الغازات مثل الكحول والأسيتون و البروبان و أول أكسيد الكربون الموجود في دخان الحرائق . أي إنها تعمل كدائرة إنذار ضد الغازات والحرائق. جهد التشغيل للدائرة ١٢ فولت والتيار ١٥٠ ملي أمبير . عند تجميع الدائرة يجب وضع المكونات بالطريقة الصحيحة على اللوحة المطبوعة مع ملاحظة أن المقاومة R1 قد تسخن أثناء تشغيل الدائرة ولذلك يجب أن تكون مرتفعة عن اللوحة المطبوعة قليلا .

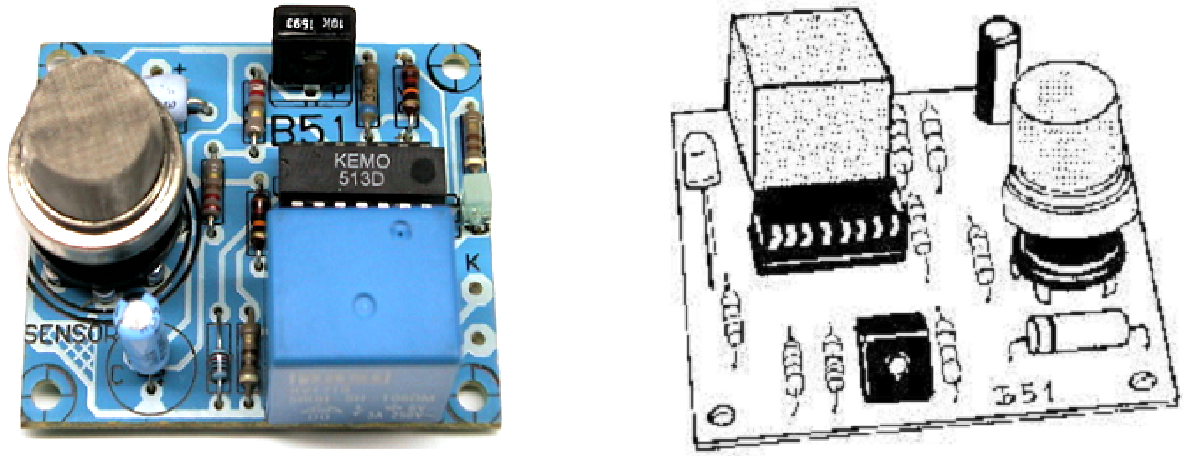
This instrument indicates gases such as alcohol, acetone, benzole, propane, carbon monoxide (contained in the smoke of fire). Perfect as alarm for gases + fire. Operating voltage: 12V=, approx. 150mA, indication: LED and relay (1 x ON 3 A).

Please pay attention to the correct assembly of the board: the IC has a chamfering on one side which must correspond to the assembly print. In case of the light emitting diode and the elca "C", the right polarity must be observed, too.

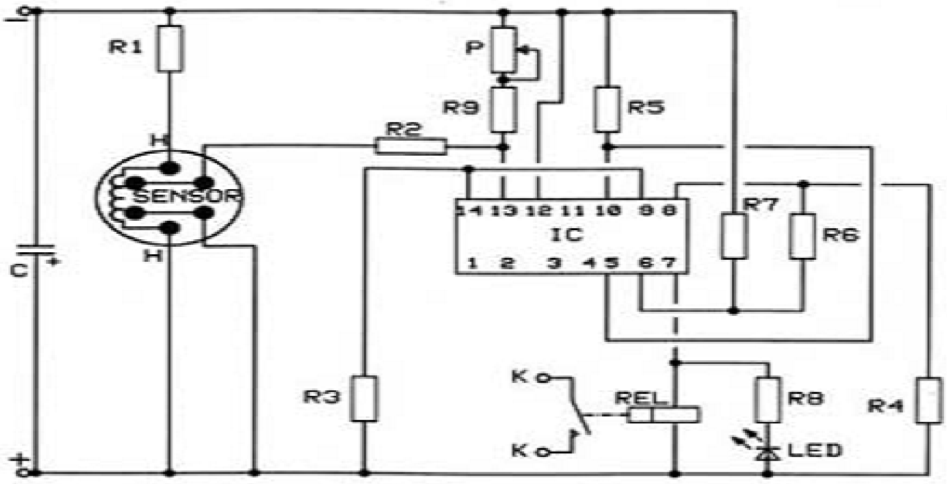
During operation the resistor R1 gets hot. Therefore, it must be installed in such a manner that the resistor body has a distance of approx. 1...2 mm from the board (for better ventilation).

The gas sensor is only stuck into the holder after having assembled the board completely. The gas sensor fits into the appropriate holder in 2 different positions. Due to the fact that the head of the sensor is constructed symmetrically, it operates in both possible positions in which it may be stuck into the holder. If the finished board is installed in a case, breathers must be drilled into the case. These holes are necessary so that the head of the sensor is able to "smell" the gases and furthermore that the circuit will be ventilated due to the development of heat of R1. A total of at least 8 holes with a diameter of 6 mm should be drilled into the case near the head of the sensor (or more).

Attention: This kit is a "hobby circuit" for teaching and experimental purposes and must not be used for protection of life and property! We, Messrs. Kemo, decline any liability if escaping gas or a fire which has developed remains undiscovered through failure of the circuit and if damage to life and real values emerge from it.



layout and real view

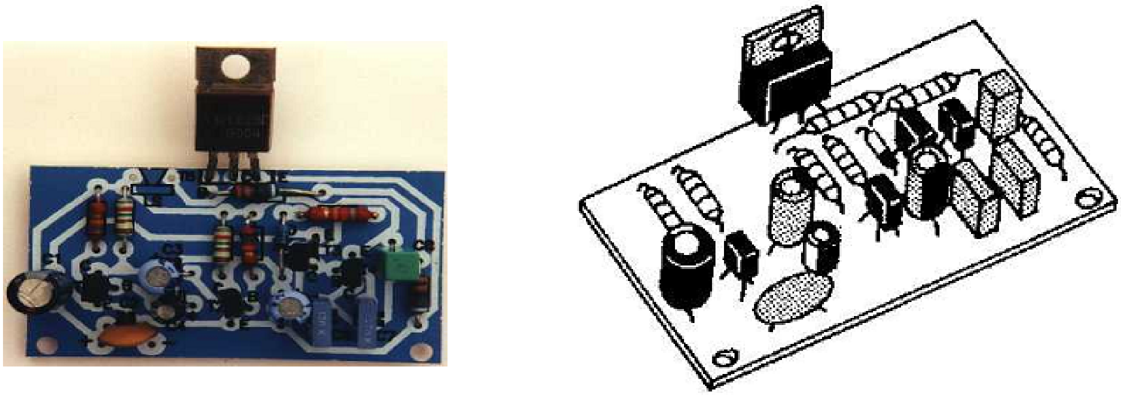


CIRCUIT DIAGRAM

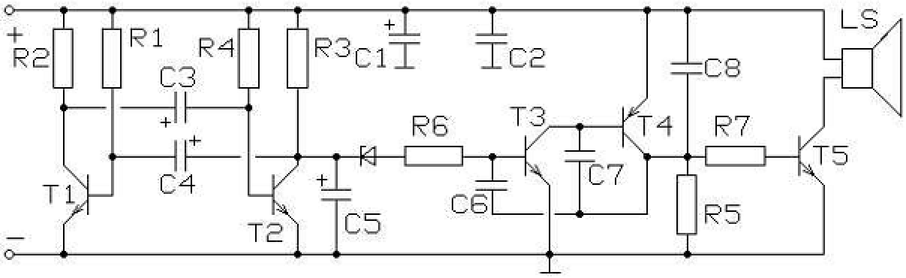
8-Destroyer Siren No. B052 (كسر الزجاج) دائرة إنذار ضد الكسر

دائرة إنذار ضد الكسر تعمل بقدرة من ٣ وات إلى ١٥ وات بناء على جهد التشغيل من ٦ فولت الى١٢ فولت وتعمل مع السماعات التي لها مقاومة ٨ اوم . ولجهد التشغيل أعلى من ٦ فولت لابد من تبريد الترانزيستور T5 .

Warship siren "Clear decks for action". In rapid intervals sounds a shortly swelling tone: Uiiit... Uiiit...Power: 3...15 W, depending on the operating voltage. For 6...12 Volt. For loudspeaker connection 8 Ohm. The siren requires depending on the operating voltage 1...2 Ampere. With operating voltages of more than 6V, it is necessary to cool the transistor T5. It will be necessary to fit a cooling plate of approx. 50 x 50 x 3 mm. Please take care to mount correctly the transistors.



THE LAYOUT AND THE REAL VIEW



CIRCUIT DIAGRAM

9- Metal searching device No. B055 دائرة للبحث عن المعادن

هذه الدائرة تستطيع الإحساس بالأجسام المعدنية داخل الحوائط أو الأسقف بعمق لا يزيد عن ٦ سم . وجهد التشغيل للدائرة ٩ فولت.
ويجب لف الملفات بحيث أن تكون اقل مسافة بين طرفي الملف ٨ مم و لا يجب وضع الدائرة في علبة معدنية ولكن توضع في علبة
معزولة كما يجب ضبط المقاومة المتغيرة P على قيمتها المتوسطة.

The device locates any metal element till a maximum of 6 cm in walls, floors, etc. Indication is realized through LED. The sensitivity is adjustable. With the help of the ferrite antenna exact locating is possible.

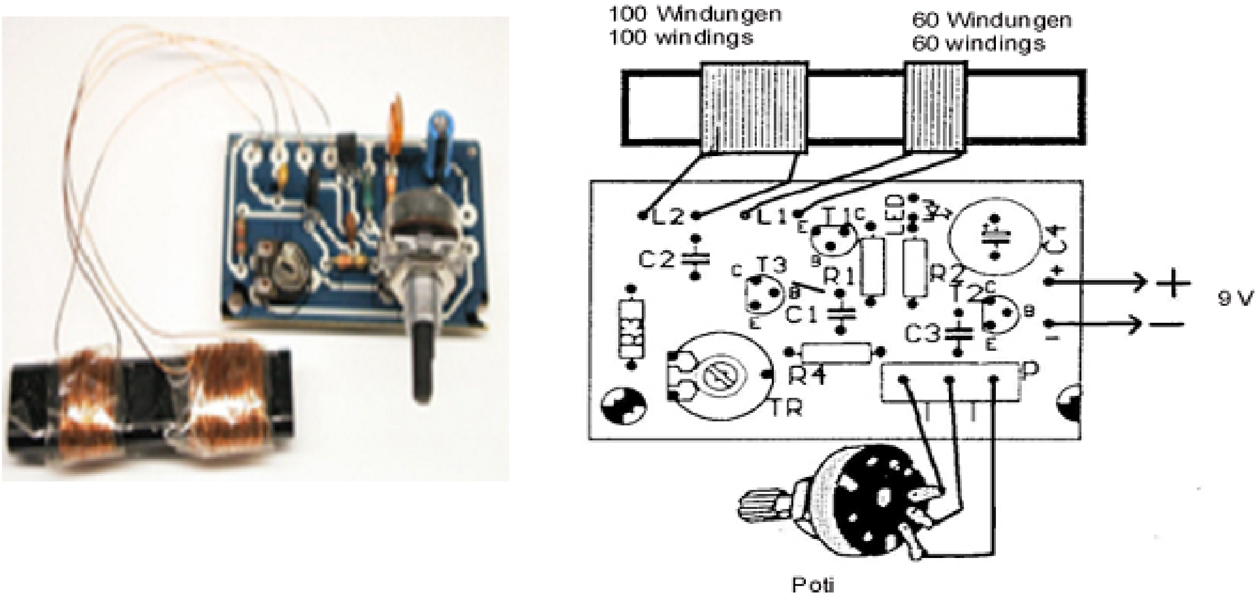
Operating voltage: 9V=.

Please take care that the parts are correctly placed on the printed wiring board: The transistors are at one side of the case chamfered. With the luminous diode you will find the "A" junction (anode) as the longer lead wire. The coils are to be winded with the enclosed varnished wire at a distance no less than 8 mm with one another/side by side and to be tinplated at the wire ends.

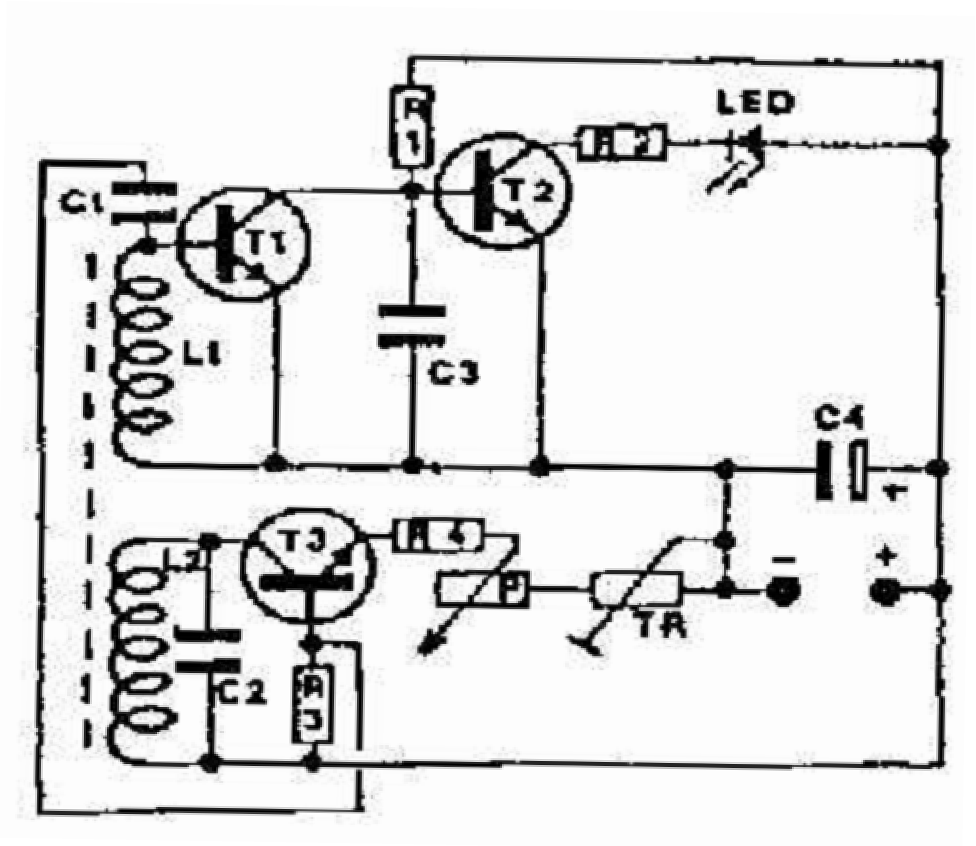
Caution: Do not wind the coils one upon the other. Now, you have to scrape off the light varnish cover on the wire ends using a razor blade or screwdriver and, after that, tin-plate the blank cupper with a soldering iron. The coils are connected with the printed wiring board. A 9V battery is sufficient as working voltage.

The apparatus should not be placed in a metal case, but only in an isolated case.

Balancing: the potentiometer (P) has to be turned to mid-position. Afterwards, the trimmer potentiometer "TR" has to be adjusted that way, the luminous diode LED just goes out. Now, fine adjustment can be realized with the potentiometer. The position where the LED just goes out is regarded as the most sensitive one. The LED will light up if a piece of metal is approached to the ferrite antenna (3...6 cm). In case of not being possible adjusting the LED and the wiring is correctly placed, then both junction wires of the coil with 60 windings are to be exchanged with one another. Welding the printed wiring board in a water-proof plastic bag, wiring can be used under water! Divers are now capable, for example, to distinguish seaweed covered stones from overgrown old cannons or wrecks!



THE LAYOUT AND REAL VIEW



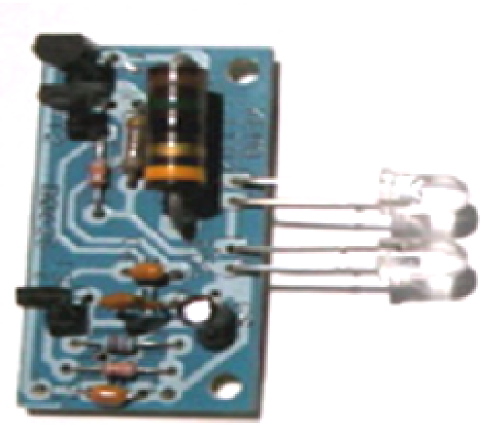
THE CIRCUIT DIAGRAM

10-Infrared light barrier, range > 18m No. B062 دائرة انذار اشعة تحت الحمراء بمدى ١٨ متر

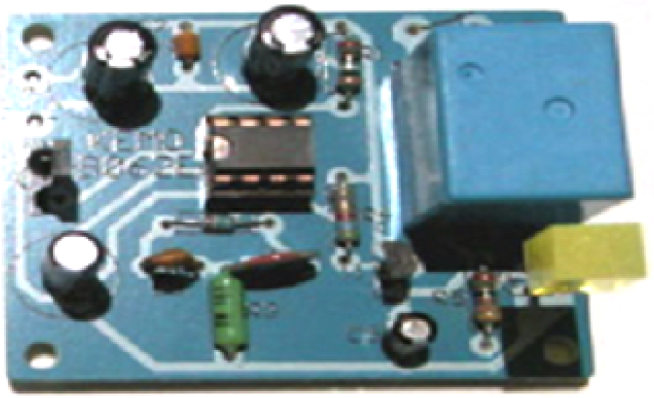
دائرة مانع ضوئي بالأشعة تحت الحمراء الغير مرئية . جهد التشغيل لدائرة الإرسال ٩ فولت ولدائرة الاستقبال ١٢ فولت . ولا يقل تيار الدخل في كلا من الدائرتين عن ١٥٠ ملي أمبير ولابد من وضع دائرة الاستقبال بحيث تكون مواجهة تماما لدائرة الإرسال كما بالشكل التالي و كلما اتسعت المسافة بين الدائرتين كلما ارتفعت الحساسية بالنسبة للتوجيه.

Light barrier with invisible infrared light beam. Transmitter and receiver included! Operating voltage: transmitter 9V, receiver 12V, relay 1 x ON max. 3A. Ideal for alarm systems, automatically animal picturing, remote control for garage doors, etc. With incorporated infrared filter for day operation!

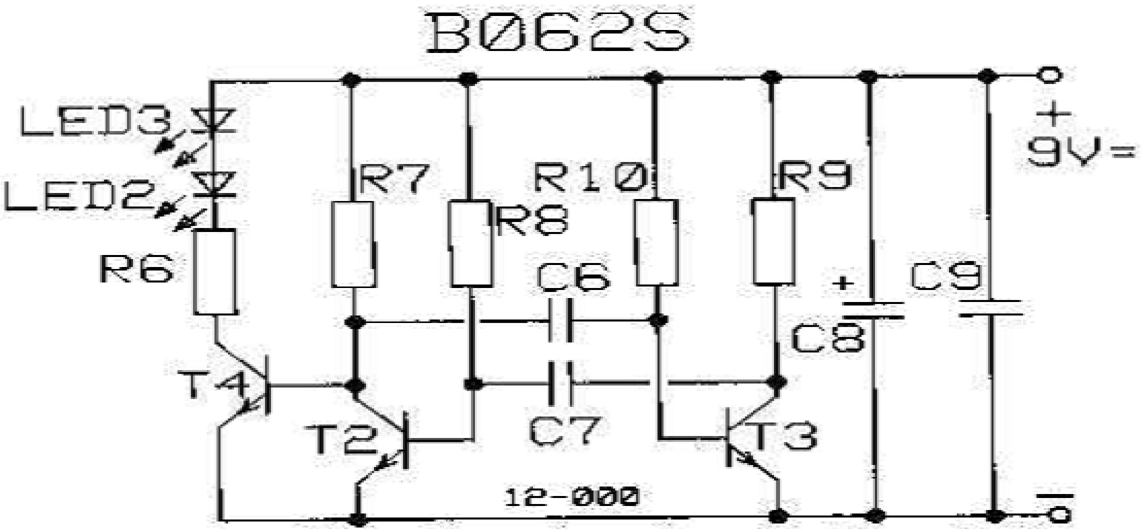
Both printed wiring boards are equipped with the components following the figure. The receiver p.w. board has to be fixed that way that the transmitter is within the sight of the infrared diode "IF". The receiver needs a well filtered d.c. voltage of 12V, approx. 100mA, supplied by power pack or battery. The transmitter needs a voltage of 9V having a current supply of approx. 50...80mA. Using batteries it must be considered that they are sufficiently powerful to feed 100mA. Small 9V transistor batteries will not withstand in case of continuous operation! Both infrared light diodes of the transmitter must be adjusted to the diode of the receiver "IF"! The longer the distance, the more exactly the LED transmitting diodes have to be aligned with the receiver. Whenever the transmitter radiates in the direction of the receiver, the LED of the receiver will light up and the relay pulls up. Using optical or focus lenses in front of the transmitter and receiver may extend the range of the light barrier considerably. If the receiver is exposed to strong solar radiation, we recommend to protect the IR receiver diode "IF" from behind and laterally with a tube against light scatter. Then the opening of the tube must point into the direction of the transmitter. The inside of the tube should be matt black see drawing.

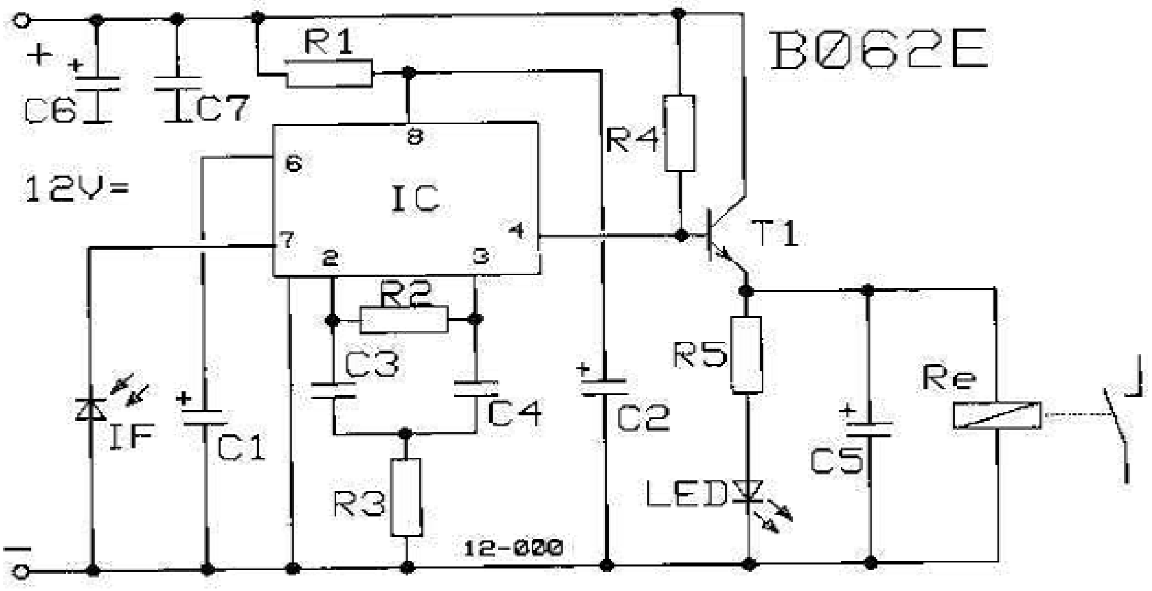


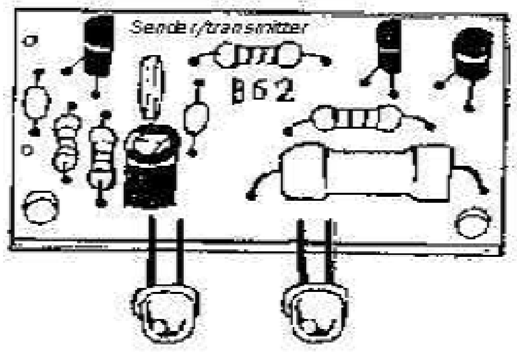
**B062S
IR TRANSMITTER**

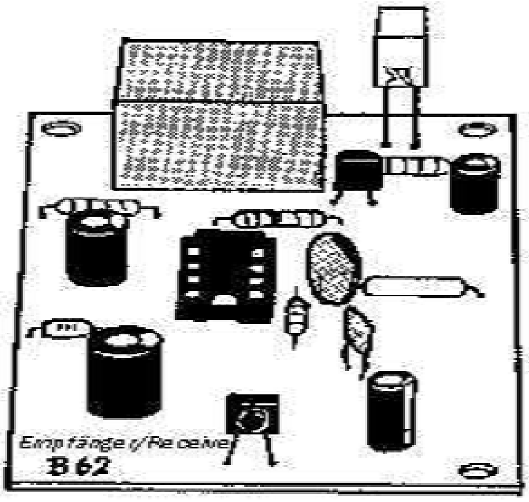


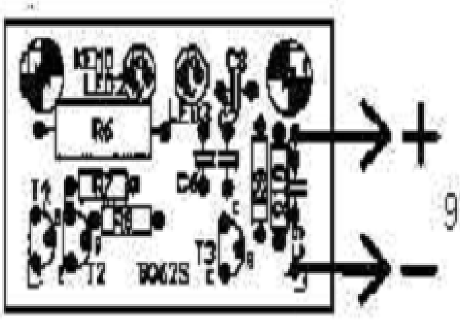
**B062E
IR RECIEVER**

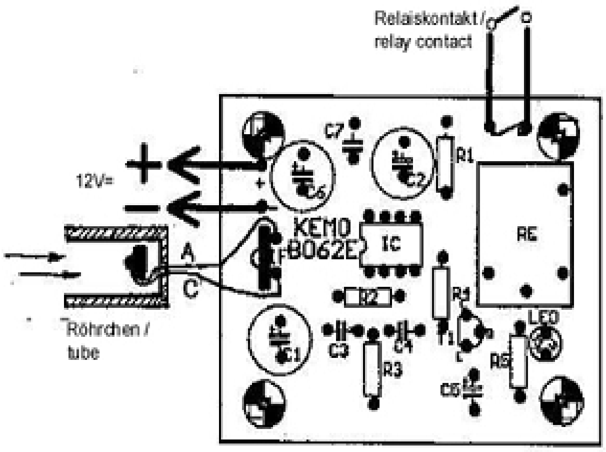

B062S
LED3
LED2
R6
R7
R8
R10
R9
C6
C7
C8
C9
T4
T2
T3
+
9V=
12-000


B062E
+
12V=
C6
C7
R1
8
6
IC
7
2
3
4
R4
T1
R2
R5
C3
C4
C2
IF
C1
R3
LED
C5
Re
12-000


Sender/transmitter
B62


Empfänger/Receiver
B62

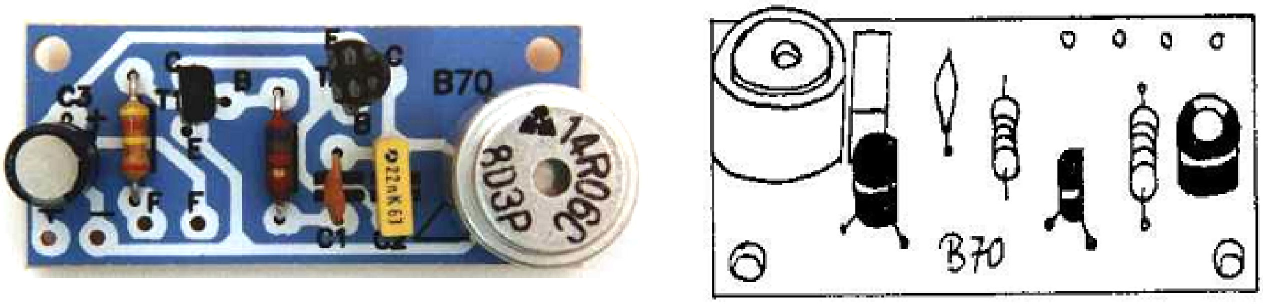




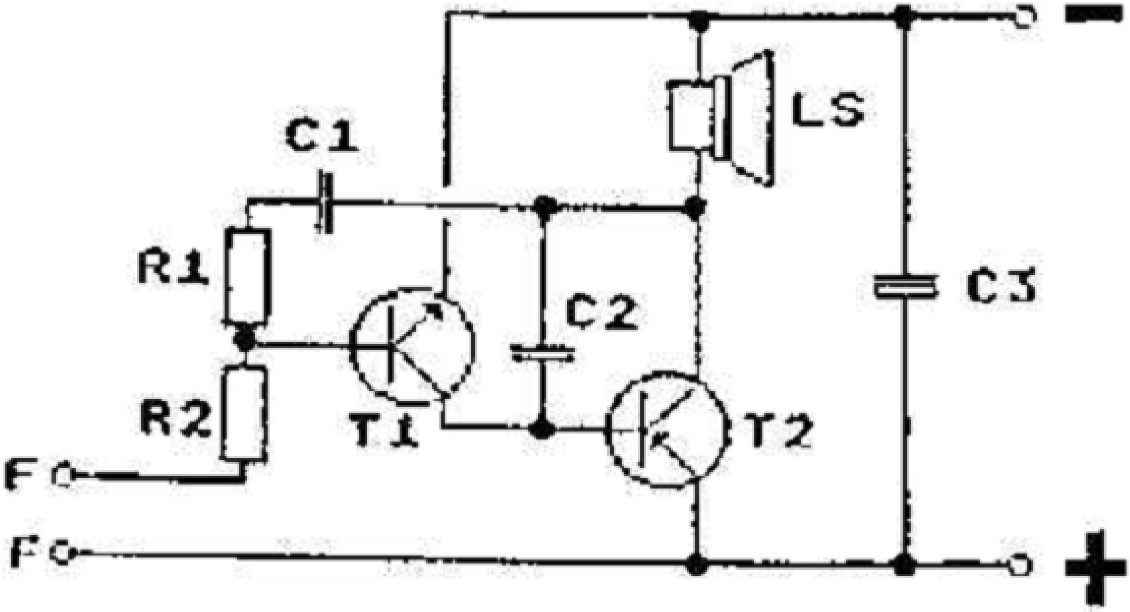
11-Water Detector No. B070 دائرة إنذار ضد الماء

تطلق الدائرة الإنذار في حالة لمس الماء ومن الممكن استخدامها في الإشارة إلى انفجار ماسورة الماء أو امتلئ حمام السباحة . كما يمكن توصيل ال SENSOR بأسلاك طويلة . جهد التشغيل للدائرة من ٦ فولت إلى ٩ فولت . كما يجب وضع المكونات على اللوحة المطبوعة بطريقة صحيحة . وعند طرفي التوصيل F يجب لحام سلكين بطول ١ سم بحيث يلمسا الماء في وقت واحد وان لا يلمس أحدهما الأخر .

releases sonorous alarm in case of contact with water. This device will indicate water main burst, overflow washing-machines, full baths, etc. The sensor may be connected through a longer cable. Operating voltage: approx. 6...9V.
This board should be equipped according to the parts list and the board diagram. At the two connections "F" have to be soldered two bare wires in a distance of approx. 1 cm. Whenever these two wires will dip into water at the same time, there will sound an audible tone out of the loudspeaker. Both sensors could be connected through a longer insulated cable (max. approx. 3 meters) with the printed board. Please take care that the two sensor wires have been well insulated against each other at the tip of the extension cable! Even light contact resistance caused by humidity will release the alarm. In case of bad isolation there will sound rapid and repeating clicks in the loudspeaker. If the bare sensor wires have no contact with water, the device will hardly require current (‹ 3 µA). Therefore, the water detector could be operated through a battery. The loudspeaker must not be installed into a completely closed case since otherwise a sufficient volume cannot be reached. Please use a case which has at least one hole with a diameter of 3 mm in the mounting area.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

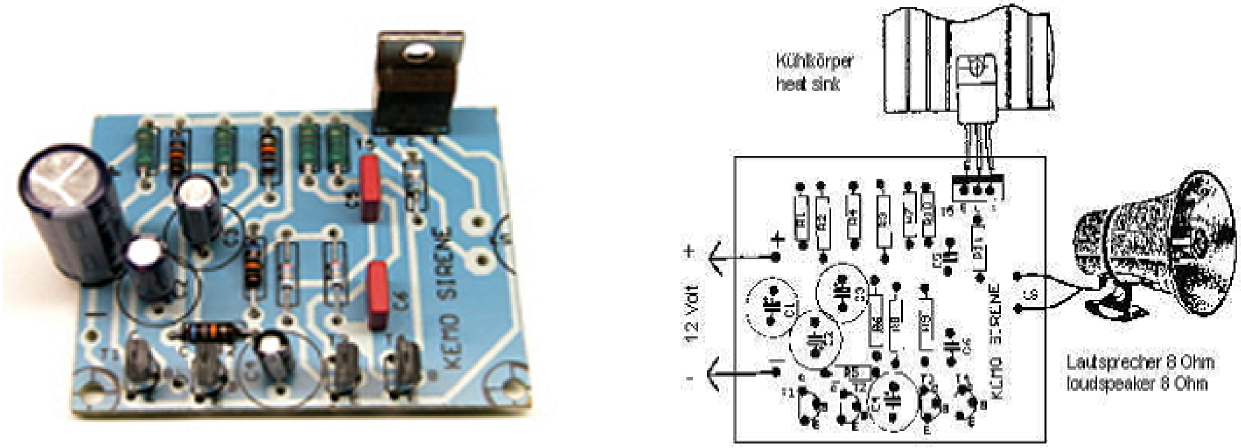
12- Martin Siren German police siren 12V max. 15W No. B077 سرينة البوليس الألماني

دائرة سرينة البوليس الألماني بقدرة قصوى ١٥ وات وتعمل مع السماعات من ٨ اوم إلى ١٦ اوم وتعطي الدائرة ١٥ وات مع السماعة ٨ اوم و ٧ وات مع السماعة ١٦ اوم .

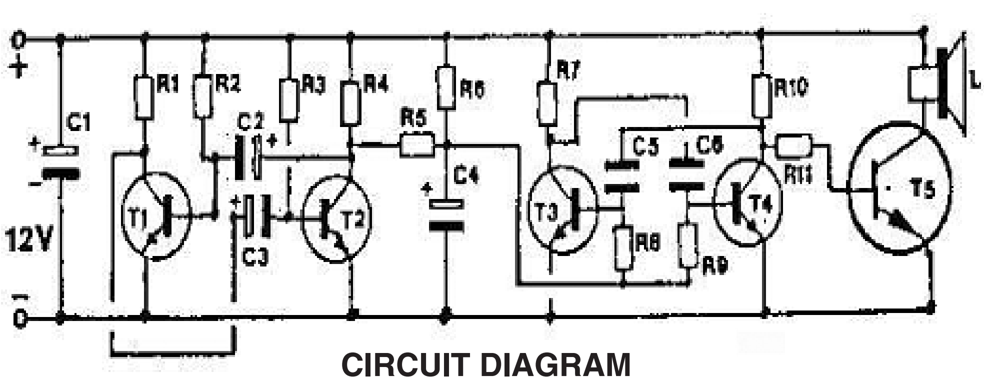
Especially high-powered siren with the tune similar to the German police siren: tutu...tutu...tutu. For loudspeaker connection: 8...16 Ohm Forbidden to be used for road traffic!

Please take special care that you carry out correct equipment of the printed board! The siren will achieve at an 8 Ohm loudspeaker max. 15 Watt. In case this high volume won't be required, it is possible to use any loudspeaker with a higher impedance. With a 16 Ohm loudspeaker the siren will achieve approx. 7 Watt, with a 32 Ohm loudspeaker e.g. 4 Watt. It is feasible to connect several loudspeakers in series, e.g. to increase the impedance (2 loudspeakers each with 4 Ohm connected in series will show a total connecting impedance of 8 Ohm). Furthermore, it is feasible to connect in series with a wire wound resistance of 4...100 Ohm a loudspeaker, in order to reduce the volume. The siren has, depending on the loudspeaker impedance, a current consumption of 0,3...2 Ampere. The current supply must, consequently, be sufficiently powerful (power supply or car-accu). Never use small dry batteries! Moreover, the loudspeaker should be prepared for the power of the siren. Too weak loudspeakers may burn out!!!

The Darlington transistor T5 must be screwed on a small heat sink (approx. 50 x 50 x 15 mm). The kit does not contain the heat sink. The heat sink has to be mounted insulated and well ventilated (it must not get into contact with other conductive metal piece parts!). In case of installation into a closed case (e.g. Kemo G082), holes for ventilation must be drilled above the heat sink. The holes must have a size of approx. 3 mm. You have to drill enough holes so that a sufficient ventilation is guaranteed.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

13- Lie-detector No. B087 دائرة كشف الكذب

في حالات الكذب أو الخوف فأنة يحدث توتر في بشرة الشخص تقوم الدائرة بالإحساس بها و توضيحها . جهد التشغيل للدائرة ٤,٥ فولت . ويجب التأكد من تجميع ووضع المكونات على الدائرة بصورة صحيحة . ولابد من توصيل قطعتين من النحاس بأسلاك طولها ٢ متر و لحامها على اللوحة المطبوعة ويتم لصق القطعتين النحاسية على البشرة على مسافة ٥ سم من بعضهما وضبط المقاومة المتغيرة بحيث يكون ال LED مطفئ فإذا حدث أي توتر للشخص تزداد المسافة بين القطعتين النحاسية و يضيء ال LED .

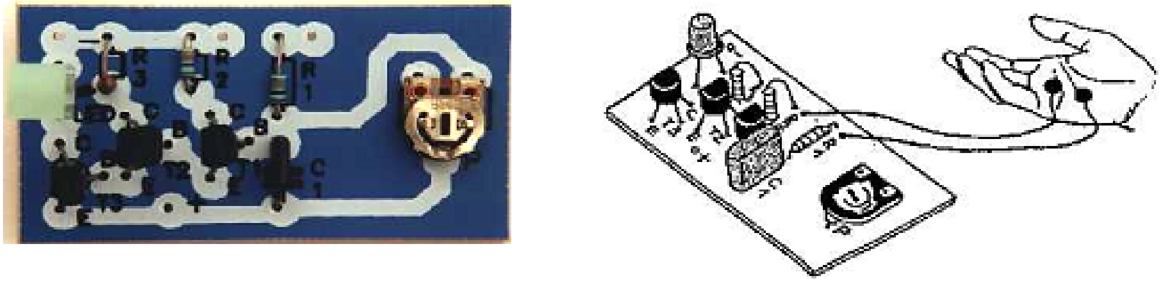
This lie-detector meters fluctuations of the skin tension and indicates those through LED. Emotional changes of man might result in a fluctuation of the skin tension (sweat), so that lies, fears, etc., may be detected.

Operating voltage: 4,5 volts.

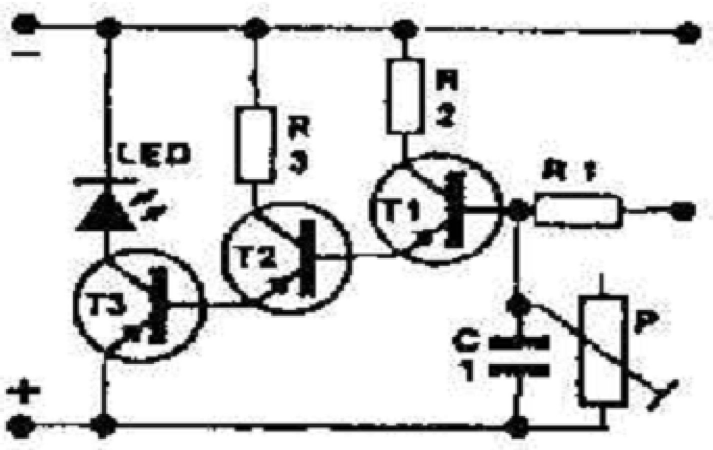
Please make sure that the light-diode is installed properly. The cathode-connection is the shorter wire.

2 coins of copper are to be connected to approx. 2 m long cables and soldered to the board- connections "skin sensor". Fix the coins with adhesive plaster on the skin at a spacing of approx. 5 cm. Upon connecting the battery, the lie-detector is to be adjusted by the trimmer poti in a position where the LED just stopped lighting. If now the skin resistance is lowered due to slight perspiration, the LED will start lighting. Each minor change of the skin resistance can be detected by this instrument. Since lying leads to so-called emotional changes inside the body and, therefore, reacts by changing the skin resistance, it is possible to detect a lie. With some patience many interesting experiments and games may be carried out.

We would like to mention that the voltage and currents in use during these experiments are absolutely harmless.



LAYOUT AND TOPVIEW



CIRCUIT DIAGRAM

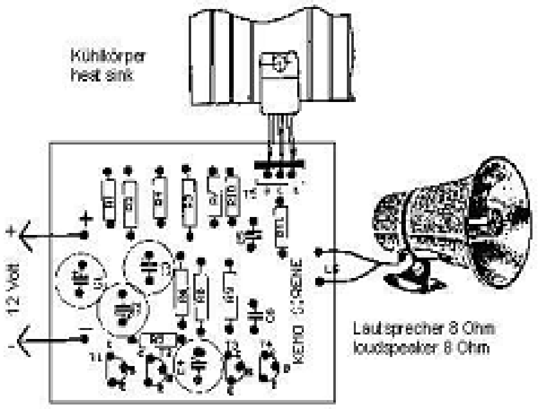
14-CO jack siren 12V 15W NO. B091 سرينة الكوجاك

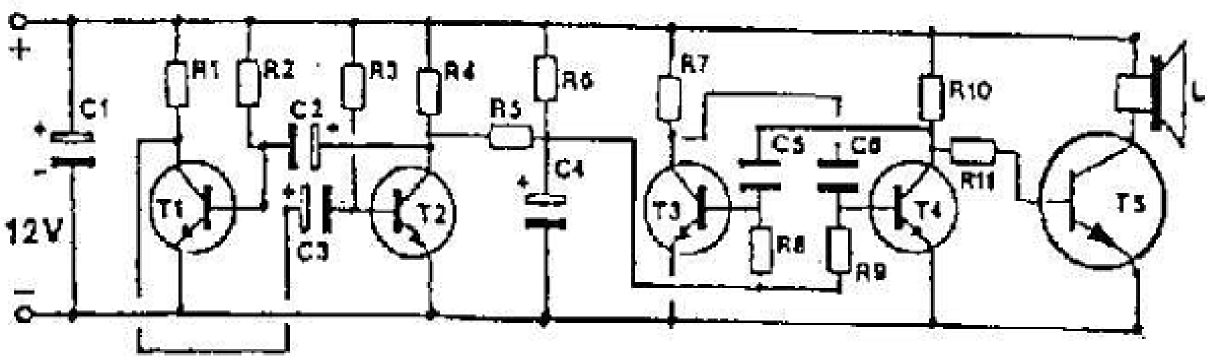
الدائرة تصدر صوت سرينة الكوجاك وتعطي قدرة ١٥ وات مع السماعات ٨ اوم و ٧ وات مع السماعات ١٦ اوم و ٤ وات مع السماعات ٣٢ اوم . ويجب تبريد الترانزيستور T5 . جهد التشغيل للدائرة ١٢ فولت .

Especially audible siren, in rapid sequences rising up and reducing sound (like the one used in Co jack police cars). Due to the high operating frequency the sound will become extremely aggressive and widely audible! For loudspeakers from 8...32 Ohm. Forbidden the use in traffic Please take special care that you carry out correct equipment of the printed board! The siren will achieve at an 8 Ohm loudspeaker max. 15 Watt. In case this high volume won't be required, it is possible to use any loudspeaker with a higher impedance. With a 16 Ohm loudspeaker the siren will achieve approx. 7 Watt, with a 32 Ohm loudspeaker e.g. 4 Watt. It is feasible to connect several loudspeakers in series, e.g. to increase the impedance (2 loudspeakers each with 4 Ohm connected in series will show a total connecting impedance of 8 Ohm). Furthermore, it is feasible to connect in series with a wire wound resistance of 4...100 Ohm a loudspeaker, in order to reduce the volume. The siren has, depending on the loudspeaker impedance, a current consumption of 0,3...2 Ampere. The current supply must, consequently, be sufficiently powerful (power supply or car-accu). Never use small dry batteries! Moreover, the loudspeaker should be prepared for the power of the siren. Too weak loudspeakers may burn out!!!

The Darlington transistor T5 must be screwed on a small heat sink (approx. 50 x 50 x 15 mm). The kit does not contain the heat sink. The heat sink has to be mounted insulated and well ventilated (it must not get into contact with other conductive metal piece parts!). In case of installation into a closed case (e.g. Kemo G082), holes for ventilation

must be drilled above the heat sink. The holes must have a size of approx. 3 mm. You have to drill enough holes so that a sufficient ventilation is guaranteed.





CIRCUIT DIAGRAM

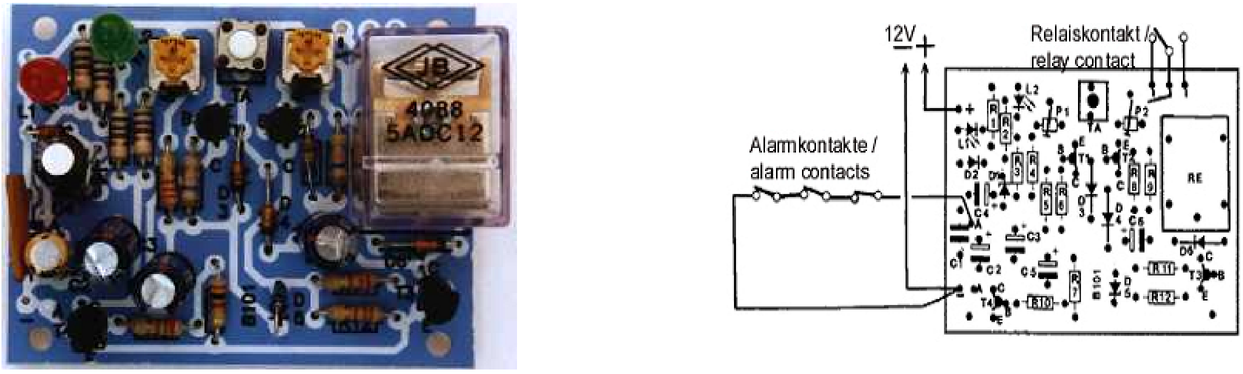
15- Universal Alarm System For car, boat, house, garden, yard No. B101

نظام إنذار عام للسيارة أو المنزل أو الحديقة

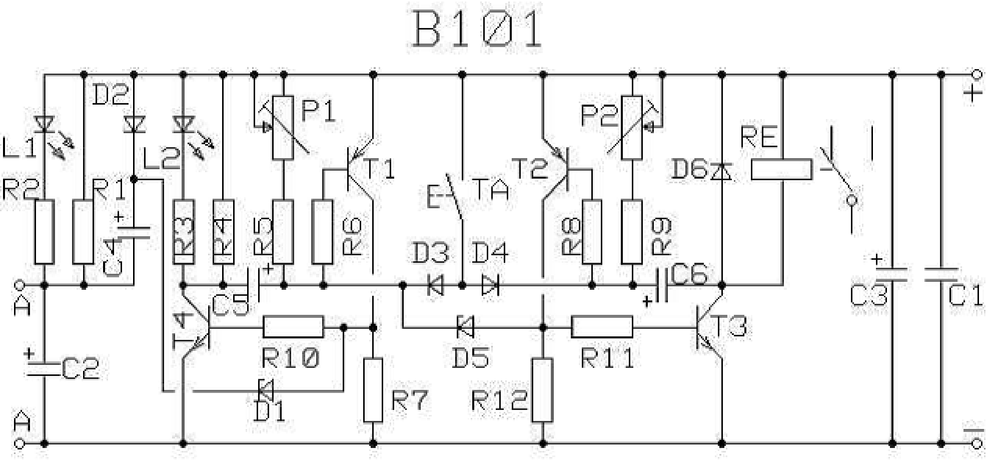
جهد التشغيل للدائرة ١٢ فولت و توضيح الإنذار من خلال LED . اكبر عدد نقاط توصيل ٢٠ نقطة مدة توضيح الإذار من ٢ ثانية إلى ١٥ ثانية . ويجب تجميع الدائرة بطريقة صحيحه ومن الممكن توصيل اللوحة المطبوعة الواحدة بنقطة توصيل واحدة أو اكثر .

Professional alarm unit for 12 Volt. Connecting features: max. 20 rest contacts. Contact control and alarm indication via LED's. Adjustable rise-delay time and alarm duration: approx. 2...15 seconds and 8...30 seconds, in accordance with the police law.
Please pay attention to the right assembly of the board. All transistors and LED's have one flattened side which must correspond to the print on the board. The "K"-connection of the diodes is marked with a ring. One or more rest alarm contacts can be connected with this alarm unit. Normally the contacts must be closed. If all contacts are closed the LED "L1" lights. If one of the contacts is opened or if the cable which leads to the contacts is cut the alarm will be released. At first the second LED "L2" lights as "alarm indication".
This LED lights during the adjusted rise-delay time. During this time no alarm is given. During the delay time the alarm can be switched off through pressing the key "TA". After expiry of this rise-delay time the relay picks up and releases the alarm for approx. 9...30 sec. (adjustable). After that an alarm is only released again if the rest contacts were closed again and opened once again. This corresponds to the requirements by the

legislator. Operating voltage: 12 Volt = approx. 40...100mA (quiescent and alarm condition). The alarm system also reacts if the rest contacts were only opened for a short moment and then immediately closed again. So-called "reed contacts" are very suitable as contacts. These are switches which are closed when approaching to a magnet and which switch off when moving away from the magnet and thus releasing the alarm. For example the magnet will be fastened at the leaf of a window or door and the reed contact is fastened at the frame. Then if the door or the window is opened the magnet moves away from the contact and the alarm is released. Fine trip wires can also be tensed. If these are ripped up the alarm also releases. (Securing of properties, paths, pictures etc.).



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

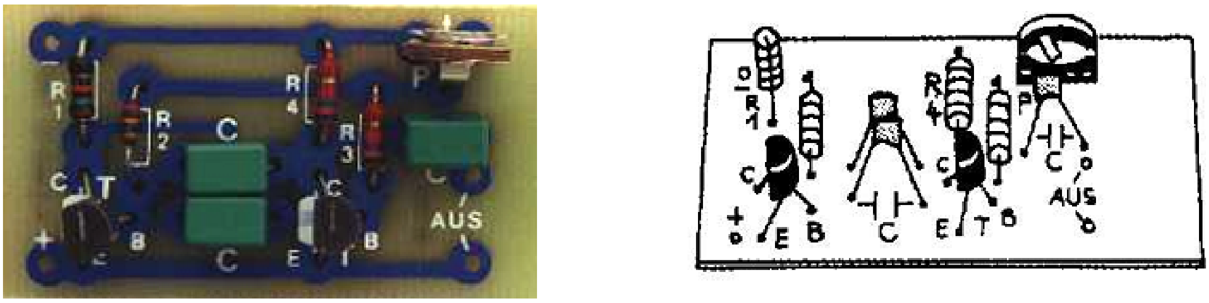
16-Tone generator 6...12V No. B103 دائرة مولد ذبذبات

النطاق الترددي الذي تنتجه الدائرة من ١ كيلو هيرتز إلى ٥٠ كيلو هيرتز . وجهد التشغيل من ٦ فولت إلى ١٢ فولت والدائرة تنتج نغمة موجة مربعة (Square wave) . وتستخدم كمصدر للإشارة (signal source) لاختبار دوائر التكبير والراديو والدوائر السمعية .

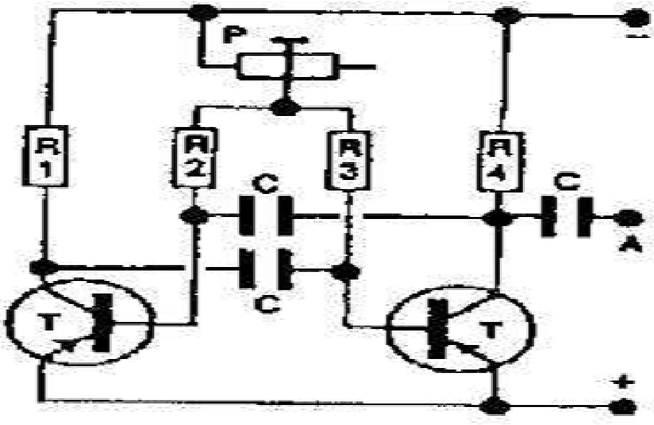
Adjustable frequency: approx. 1...50 kHz. Operating voltage: 6...12V. Short-circuit proof and capacitive output. This multi vibrator produces the tone as square-wave signal. Usage: As signal source in order to test amplifiers, radios, phono devices, etc. The harmonic waves will reach just into the VHF-range.

This tone generator works with the standard-multi vibrator circuitry. Especially suitable for operation will be a small 9V battery. It is feasible to connect at the output a highly ohmic earphone. Or, it is possible to connect the output with an amplifier, radio, tape-

recorder, etc. Due to the abundance of harmonic waves of this circuitry it is also possible to feed the signal e.g. at the antenna of the radio or into the i.f. section. Then, it will also get to the loudspeaker.



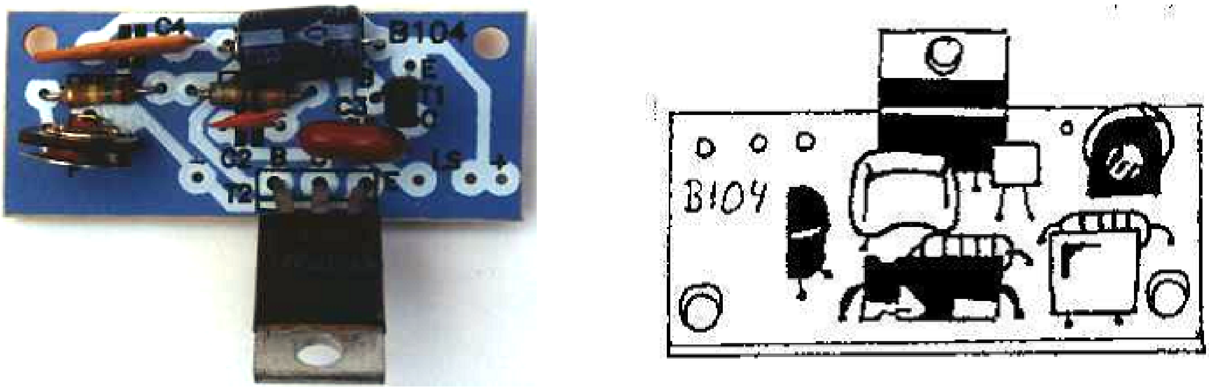
LAYOUT AND TOP VIEW



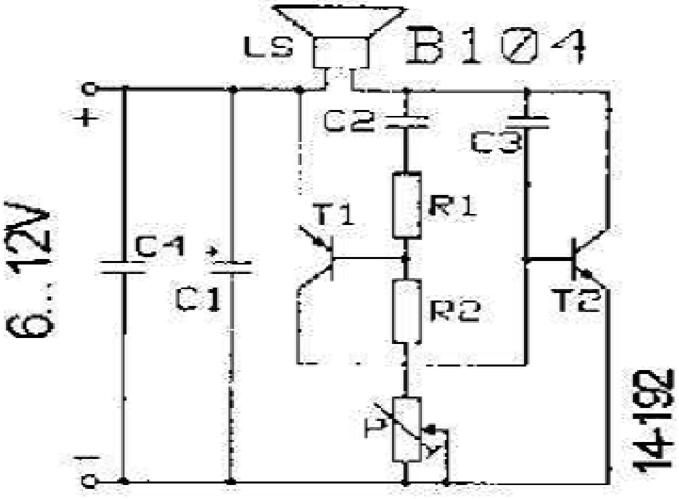
17- Ship siren No. B104 سرينة السفن

هذه الدائرة تنتج صوت مرتفع وثاقب وهي مناسبة كدائرة إنذار وكجرس للباب . جهد التشغيل من ٦ فولت إلى ١٢ فولت. أقصى قدرة للدائرة ٥ وات مع السماعات ٨ اوم .

produces a loud, deep hooter tone similar to those of the big vessels. Also suitable for alarm-systems, door bells etc. For 6...12 Volt. Loudspeaker socket: 8 Ohm, max. 5W
Mounting instructions: Please pay attention to right installation of the electrolytic capacitor C1 (+ and -). The power transistor T2 must be screwed on a small cooling plate (approx. 5 x 5 cm, not included in the kit). The cooling plate must not touch any other metal parts, as it is electrically connected with the collector of the transistor T2 and may trigger short-circuits. The tone pitch can be adjusted by using the trimming potentiometer. However, the tonality depends very much on the used loudspeaker and on the kind of installation of the loudspeaker. Please use a large loudspeaker if possible and install it according to one of our proposals.
Short-circuits and overload can damage the transistors!



LAYOUT AND TOPVIEW



CIRCUIT DIAGRAM

18- Robot-voice No. B107 دائرة تصدر صوت الإنسان الآلى

TOP VEIW

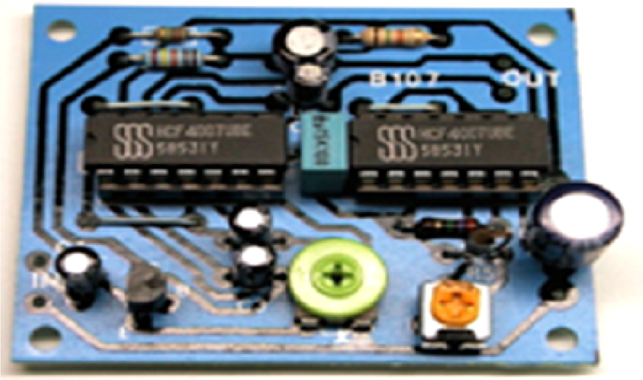
يجب أن توصل الدائرة بين الميكروفون ودائرة التكبير . جهد التشغيل للدائرة من ٩ فولت إلى ١٢ فولت كما يمكن التدخل في الصوت الناتج من خلال المقاومة المتغيرة P1 وتغيير ترددها من خلال P2 .

alternates the introduced speech so that it sounds like the voice of a robot. Adjustable effects. The device should be connected between the microphone and amplifier (or tape recorder). Operating voltage: 9...12V.

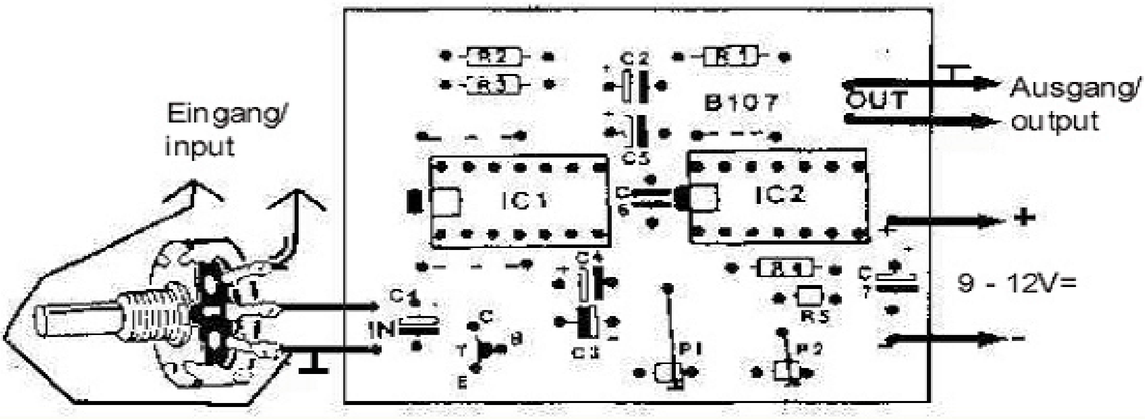
Please place the IC's in the sockets after having finished the mounting, and take care not to touch the junction wires (MOS-IC's have a high static sensitivity!). The notch at the IC's has to coincide with the print on the board! At the input should be placed either a microphone or any other signal (e.g. tape recorder), connecting afterwards the output with a final amplifier. Please take care that all earth connections are placed at the correspondingly marked poles

Through the trimmer potentiometer P1 regulation of intensity (cross talk) and through P2 regulation of frequency is feasible. Please keep the wires between the board and potentiometer as short as possible in order to avoid humming and interferences. We recommend also to mount the device into a metal housing and to earth the housing.

Please do not forget the three wire bridges on the printed circuit board! (Marked with dotted line.)

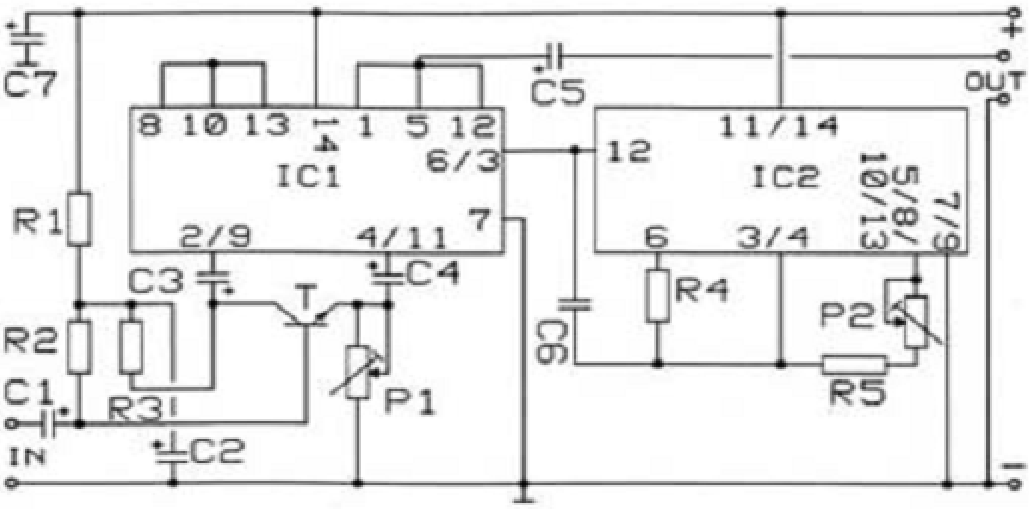


LAYOUT



Mit dem Poti 10 K kann die Lautstärke geregelt werden (nur wenn nötig).
Das Poti ist nicht im Bausatz enthalten.
With the potentiometer 10kOhm volume can be adjusted (only if necessary).
The potentiometer is not included in the construction set.

TOP VIEW



CIRCUIT DIAGRAM

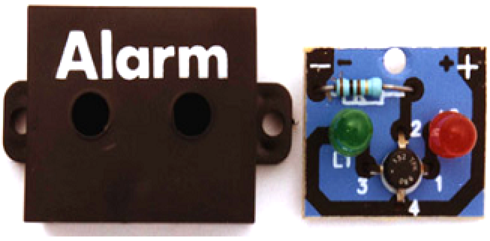
19- Alarm Display No. B198 دائرة توضيح وجود جهاز إنذار

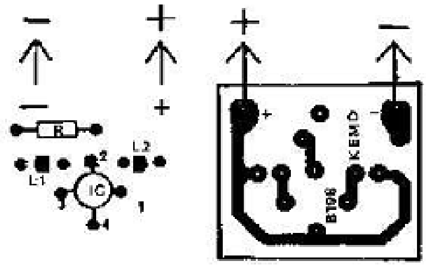
توضع هذه الدائرة لخداع اللصوص حيث أنـة عند رؤية هذه الدائرة يتوهم وجود جهاز إنذار. ويجد بالدائرة اثنين من ال LEDS مختلفين في اللون يضيئان بالتبادل . جهد التشغيل للدائرة من ٩ فولت إلى ١٢ فولت .

In this alarm display have been fitted 2 different colored light emitting diodes, which flash alternatively in short sequences. For use in cars, weekend-houses, etc. in order to simulate an armed alarm set.

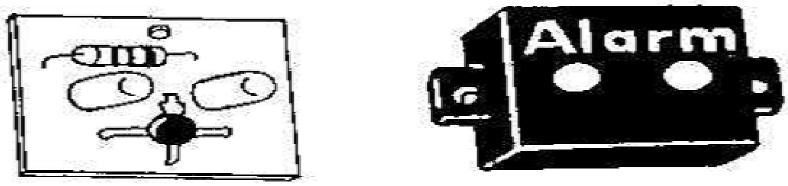
Operating voltage: 9...12V.

Please take care when equipping the printed board that correct polarity of the light emitting diodes has been observed. One side of the light emitting diode has been slightly flattened and must indicate always towards the IC. The Special-IC has as identification one longer pin (pin 3) as well as at one pin a small hook (pin 2). The IC should be soldered following the print of the board. The connecting cables have to be soldered on the copper face of the board at the positive and negative marked soldering spots. The ready board could be fitted into the enclosed housing from the backside and could be stacked fast. The operating voltage is about 9...12V and may not exceed max. 14 Volt! With higher voltages the IC and the LED's will be destructed! The small picture "Alarm" could be cut out and be stacked with adhesive tape at the window of your car.





LAYOUT



TOP VIEW

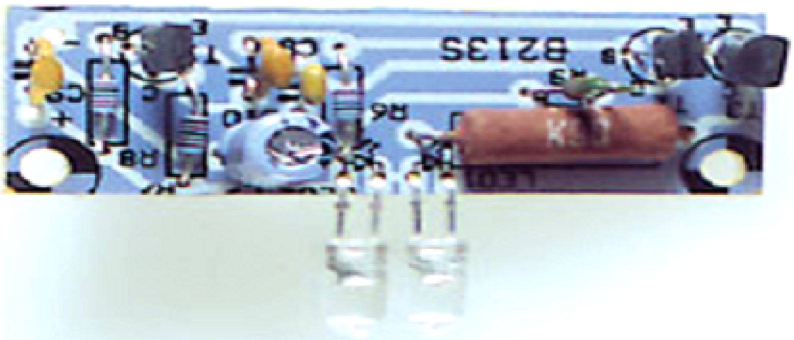
20- Infrared light barrier max. 50m No. B213 دائرة مانع ضوئي ٥٠ متر

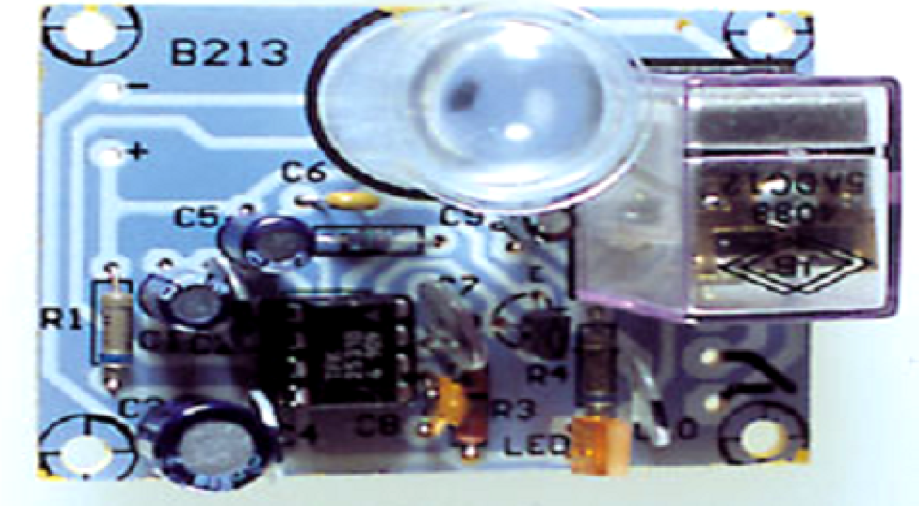
دائرة مانع ضوئي كالسابقة وتستخدم كدائرة إنذار ولكن لها مدى أطول وهو ٥٠ متر .

With the enclosed optics and highly sensitive photo detector this light barrier has a max. range of up to 50m! The infrared light ray is invisible for men. If the light ray between the transmitter and receiver is interrupted (if a person walks through it) the relay in the receiver switches. Operating voltage: transmitter: 9..12V= approx. 70mA, receiver 12V= approx. 100mA. Relay contact: 1 x change over 3A.

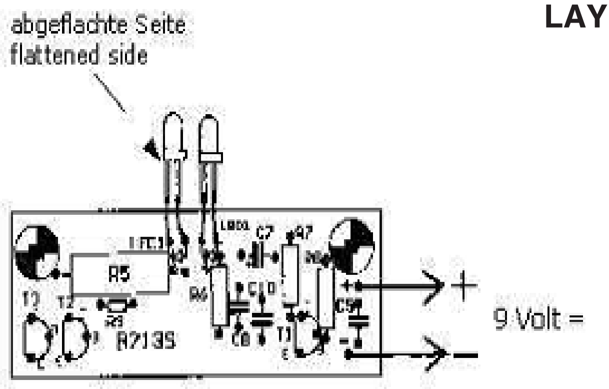
Both boards have to be tipped. The phototransistor of the receiver is inserted into the board up to the limit stop (please pay attention to the correct polarity, one side of the phototransistor is flattened). The lens optic is stuck on the board in such a manner that the phototransistor is located in the center of the diameter of the lens (in the focus). The receiver requires an operating voltage of 12V= (approx. 100mA) and the transmitter approx. 9V= (max. 70mA). Please use batteries or power units which are powerful enough (the small 9V compound batteries are too weak and not suitable!) It would be the best if you use 2 stabilized connector power units with 9V= and 12V= output voltage each.

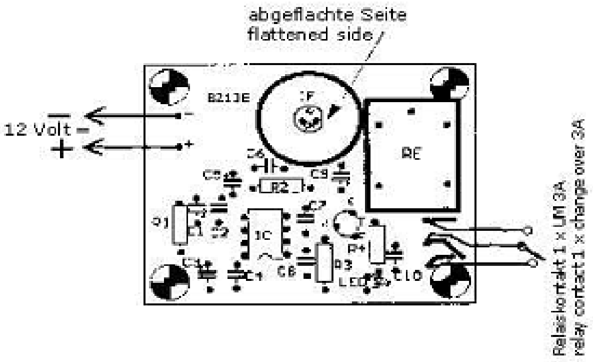
In order to protect the phototransistor from lateral incidence of light, a plastic or cardboard tube must be slid over the optics. The inside of the tube must be stained black. Furthermore the cardboard tube must prevent the incidence of light from all directions with the exception of the front. Then the transmitter must be adjusted in such a manner that it radiates through the black tube on the optics exactly from the front. The greater the distance from the transmitter to the receiver, the more exactly the transmitter must be aligned on the receiver. If the transmitter meets the receiver, the light emitting diode at the receiver lights and the relay switches on.

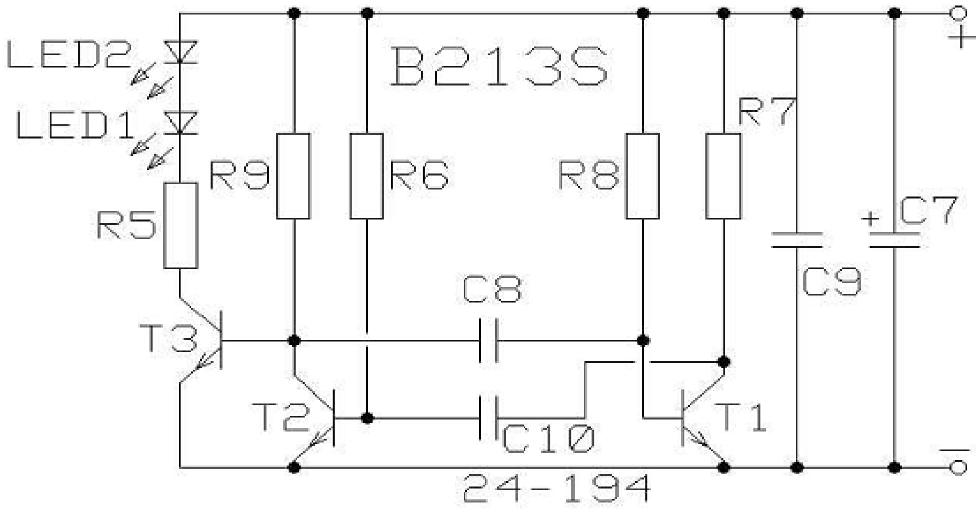




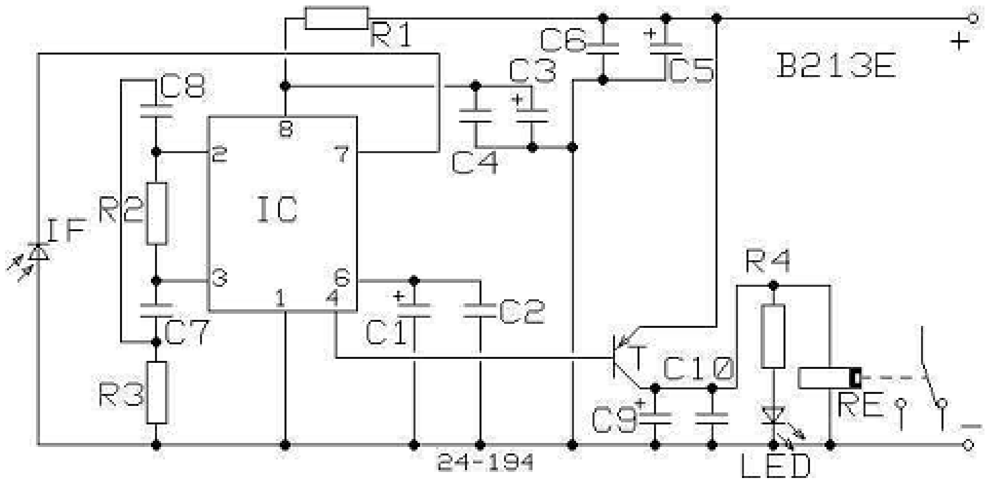
LAYOUT







CIRCUIT DIAGRAM



CIRCUIT DIAGRAM

21-Ultrasonic Distance Alerter/Alarm System NO.B214 دائرة إنذار بالأشعة فوق البنفسجية

تعطي الدائرة إنذار إذا اقترب أي جسم من الدائرة على مسافة من ١٠ سم إلى ٨٠ سم و لذلك يمكن استخدمها في أماكن انتظار السيارات وفي الأماكن التي يمنع الاقتراب منها ولتمييز الأغراض في خطوط التجميع و كدائرة إنذار ضد السرقة للأغراض الكبيرة . جهد التشغيل من ٩ فولت إلى ١٢ فولت . والدائرة تعمل بناء على مبدأ ارتداد الإشارات الصوتية من الأجسام التردد الذي تنتجه الدائرة ٤٠ كيلو هيرتز .

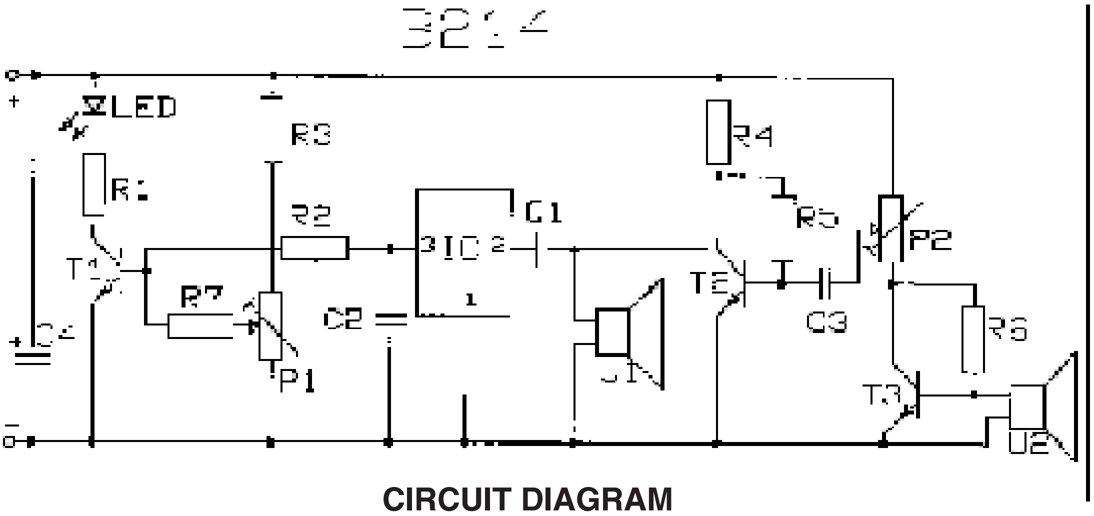
An LED lights up if a body approaches the ultrasonic sensors at a distance of 10...80 cm. Use: parking-in assistance for cars in garages, alarm signal for persons or animals staying in a certain area, object recognition at assembly lines, theft monitoring for larger objects etc. Operating voltage: 9...12V. The device works according to the same principle as the ultrasonic echo ranging of bats The board has to be equipped according to the parts list and the assembly print. Please do not mix up the two ultrasonic sensors. Type "R..." is the receiver and type "0..." the ultrasonic transmitter. The sensor heads have to be installed in such a manner that they may radiate freely (the

angle of radiation must not be impeded lateral or in front through proud plates etc.). Furthermore the sensors have to be insulated against structure-borne noise. This may be done best by storing the sensors in rubber or foam rubber. Between the case and the sensors there should be a layer of rubber or foam rubber which is at least 3mm thick. Of course, no rubber or foam rubber may be present in the direction of radiation (in front)! Wrong installations reduce the maximum radius of action!

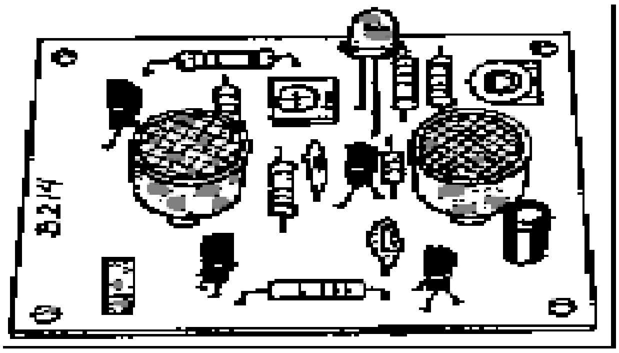
When adjusting the first time, there should be no objects in front of the sensors, i.e. at least 2m empty space. After feeding the operating voltage, at first turn the trimming potentiometer P2 to the right stop. Then adjust the trimming potentiometer P1 in such a manner that the LED lightens. Now turn back P1 until the LED just switches off.

Now you may adjust the sensitivity with P2. If you approach the sensors with a large object (e.g. wooden plate 50x100cm), the LED lights up. With large, flat objects, the radius of action is the highest. Smaller objects or uneven surfaces reduce the radius of action. If you want to use the device as parking-in assistance for your car, install the device at the wall of the garage, approximately at the height of the bumper. The LED can be fixed in a suitable place via a long cable. If now you approach the sensors with the bumper, the LED will light up as from a certain distance.

The device functions according to the principle of the sound reflection through objects. The more the objects can reflect the sound, the better will be the radius of action. Actual frequency: approx. 40kHz.



CIRCUIT DIAGRAM



TOP VIEW

22- Smoke Alarm 12V= No. B217 دائرة إنذار ضد الدخان

هذه الدائرة تعمل باستخدام المانع الضوئي للأشعة تحت الحمراء فعندما يمر الدخان أمام ال sensor يقفل دائرة الإنذار . جهد التشغيل للدائرة ١٢ فولت وتيار الدخل ١٥٠ ملي أمبير .

This visual smoke alarm switches a relay if thick smoke gets between the installed infrared light barrier. Sirens, alarm lamps etc. may then be switched by means of the relay. Operating voltage: 12V=, max. 150mA.

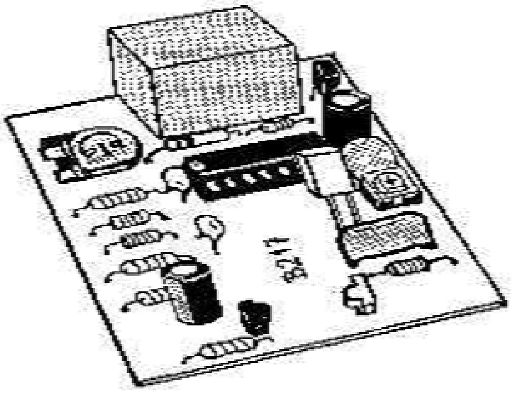
Assembly instructions: The board has to be assembled according to the parts list, board assembly plan and assembly drawing. Please pay attention to insert the electrolytic capacitors, LED's and components of the light barrier (T1 + D2) in the correct direction into the board (see drawings). The components T1 + D2 of the light barrier have one swelling each on one side of the case. On the board these "swellings" have to point at each other.

Setting into operation: The board is operated with a stabilized direct voltage of 12V. A stabilized power supply with a minimum output of 150mA (or more) should be used for this purpose. Simple and not stabilized power supplies must not be employed! The board has to be protected from outside light. For this purpose the board has to be installed in a case in such a manner that smoke can penetrate into the case and escape from it again. At the same time no outside light (e.g. from a lamp hanging nearby) must shine on the phototransistor T1. When employing the case no. "Kemo G024" recommended by us (not enclosed to the kit), the smoke holes should be drilled according to the mentioned drawing. The side holes (approx. 5 mm) have to be drilled as deep as possible into the bottom of the case. This way they will be below the board and the light will not reach the phototransistor. Smoke penetrating through these holes may escape through them again. The admission openings for smoke should be drilled at the top or at the side (behind the relay) into the upper part of the case. Please make sure that no lamp or sunlight shines directly on the phototransistor through these holes. Many holes (> 6 peaces) with a relatively large diameter (> ٦ طmm) should be drilled into the upper part of the case. In our example (according to the drawing) we assumed that the Smoke Alarm will be mounted at the ceiling. If you want to install the Smoke Alarm somewhere else, you might have to drill the holes in another way.

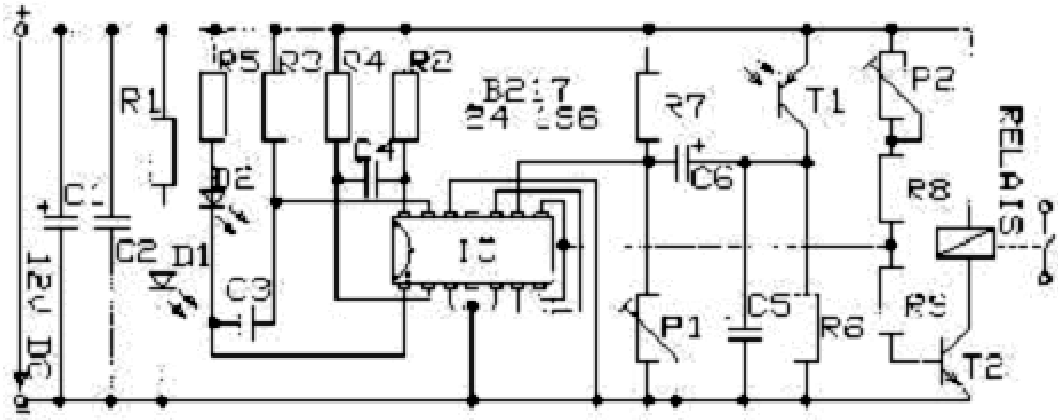
Attention: This Smoke Alarm is a circuit for instruction and amateur purposes. It is not suitable for use as smoke alarm for the protection of property and life! The circuit does not react or hardly reacts to "thin" smoke like e.g. cigarette smoke. So to try out you should use heavy and thick smoke.

Adjustments:

The Smoke Alarm can be adjusted if the board is equipped and operational and the operating voltage of 12V= is fed. The LED "D1" shines continuously as long as the operating voltage is fed (power control). Turn the trimming capacitor "P1" to the left stop and trimming capacitor "P2" to the right stop. Turn the trimming capacitor "P1" slowly to the right until the relay picks up with an audible "clack". Now turn the trimming capacitor "P1" slowly a little back again until the relay switches off again. (You will hear "clack" again). If now you tap with your finger between the light barrier (between D2 and T1), the relay has to pick up and release again (click – clack). Now the sensitivity can be increased by turning the trimming capacitor P2 to the left. It might be necessary to readjust the trimming capacitors a little until the optimum position is found. The best way to simulate smoke is to hold a milk glass plane or milky colored plastic foil between the light barrier. The relay has to react with a clear "click-clack" when putting the foil in between and removing it. In order to test the Smoke Alarm it is also possible to produce thick smoke by burning oil or plastic waste.



TOP VIEW



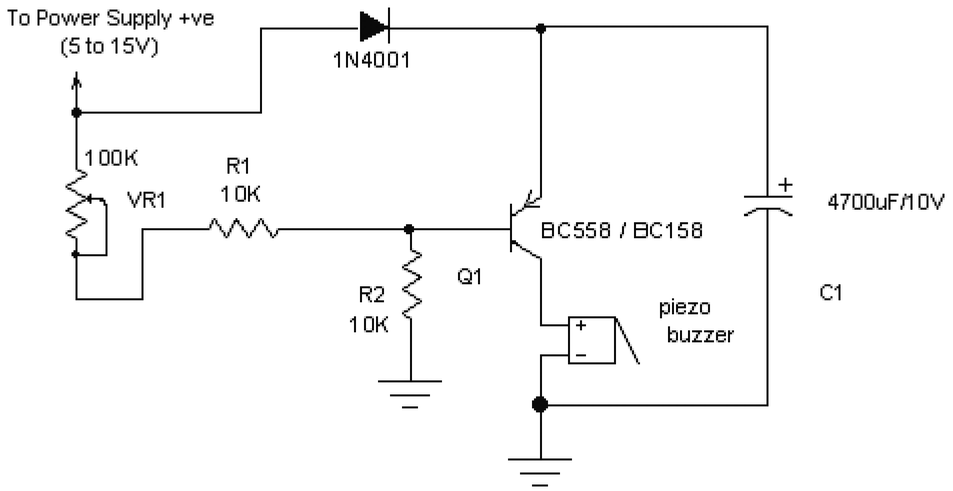
CIRCUIT DIAGRAM

OTHER CIRCUITS

1- Power supply failure alarm دائرة إنذار ضد سقوط مصدر القدرة

معظم دوائر الإنذار الخاصة بمصر القدرة تحتاج إلى مصدر قدرة منفصل لتشغيلها ولكن هذه الدائرة لا تحتاج إلى ذلك لان بها مكثف كيميائي يقوم بتخزين شحنة كافية لتشغيل الدائرة . وتستخدم هذه الدائرة مع مصادر القدرة من ٥ فولت إلى ١٥ فولت. ولضبط الدائر نقوم بتوصيلها مع مصدر القدرة ثم نقوم بتغيير المقاومة المتغيرة VR1 حتى يتغير ال BUZZER من ال ON إلى ال . OFF

Most of the power supply failure indicator circuits need a separate power supply for themselves. But the alarm circuit presented here needs no additional supply source. It employs an electrolytic capacitor to store adequate charge, to feed power to the alarm circuit which sounds an alarm for a reasonable duration when the supply fails.
This circuit can be used as an alarm for power supplies in the range of 5V to 15V.
To calibrate the circuit, first connect the power supply (5 to 15V) then vary the potentiometer VR1 until the buzzer goes from on to off.
Whenever the supply fails, resistor R2 pulls the base of transistor low and saturates it, turning the buzzer ON.

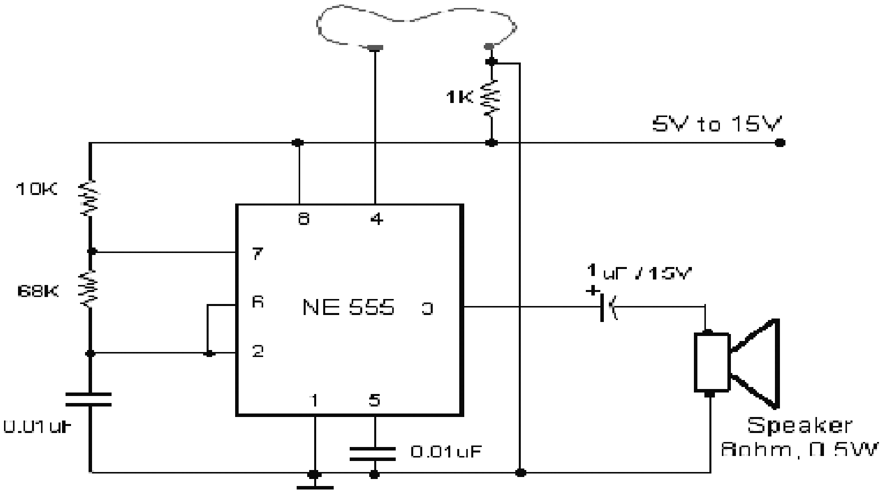


2-Theft preventer alarm دائرة إنذار ضد السرقة

هذه الدائرة تحمي مستخدمها من سرقة أمتعته أو من أن يدخل لص منزلة . ويعمل الإنذار في حالة قطع سلك رفيع جدا جدا . وتستخدم الدائرة المتكاملة NE555 لإنتاج نغمة مترددة ١ كيلو هيرتز والتي تحدث صوت عالي . جهد التشغيل للدائرة من ٥ فولت إلى ١٥ فولت.

This circuit utilizing a 555 timer IC can be used as an alarm system to prevent the theft of your luggage, burglars breaking into your house etc. The alarms goes ON when a thin wire, usually as thin as a hair is broken. The circuit is straightforward. It uses a 555 IC wired as an astable multi-vibrator to produce a tone of frequency of about 1kHz which gives out a shrill noise to scare away the burglar. The wire used to set off the alarm can be made of a thin copper wire like SWG 36 or higher. You can even use single strands of copper form a power cable. The circuit operates on a wide range of voltages from 5V to 15V.

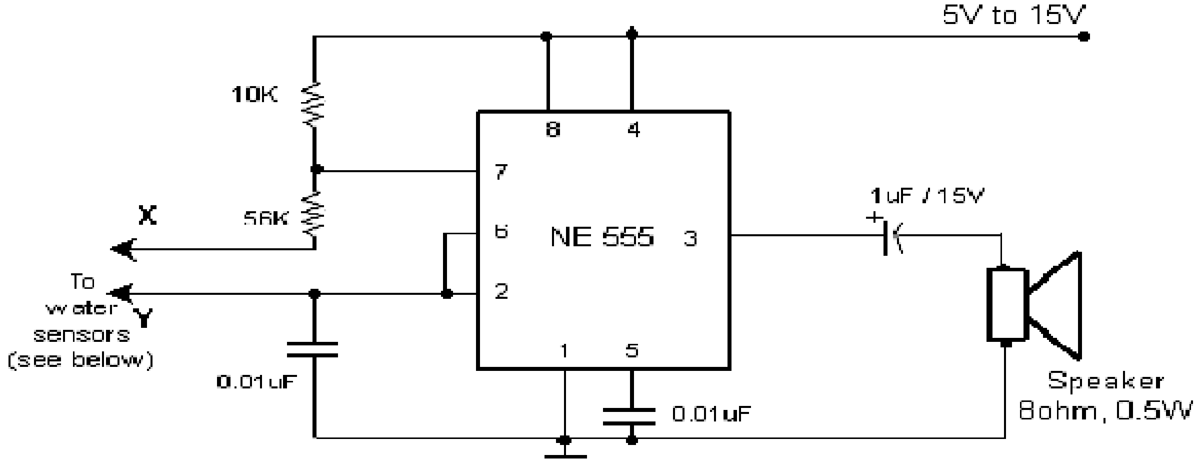
The speaker and the circuit could be housed inside a tin can with holes drilled on the speaker side for the sound to come out.

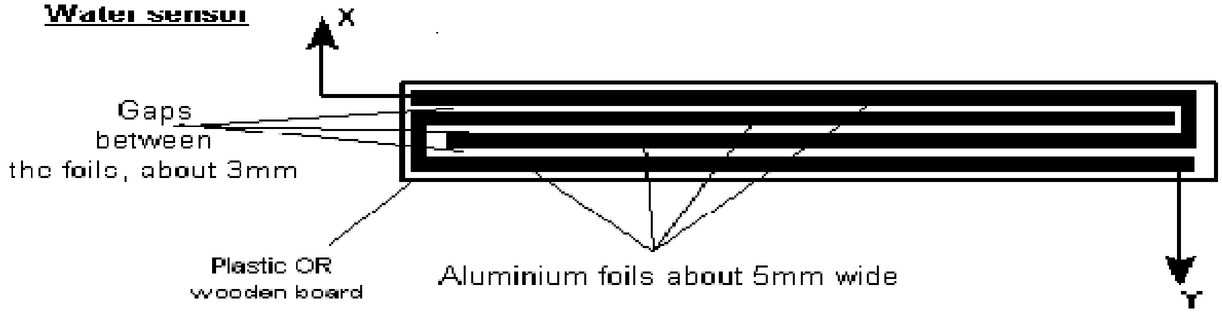


3- Rain Alarm دائرة إنذار ضد الماء او المطر

هذه الدائرة تقوم بتشغيل الإنذار إذا ابتل ال **sensor** بالماء . وتستخدم هنا الدائرة المتكاملة **NE 555** في إنتاج نغمة مترددة بتردد ١ كيلو هيرتز . عندما يبتل ال **sensor** بالماء تكتمل الدائرة مما يجعل الدائرة المتكاملة **NE 555** تنتج النغمة . ويصنع ال **sensor** من الألمونيوم وليس من النحاس لان النحاس يحتاج إلى التنظيف بصورة دورية.

This circuit gives out an alarm when its sensor is wetted by water. A 555 astable multivibrator is used here which gives a tone of about 1kHz upon detecting water. The sensor when wetted by water completes the circuit and makes the 555 oscillate at about 1kHz.The sensor is also shown in the circuit diagram. It has to placed making an angle of about 30 - 45 degrees to the ground. This makes the rain water to flow through it to the ground and prevents the alarm from going on due to the stored water on the sensor. The metal used to make the sensor has to be aluminum and not copper. This is because copper forms a blue oxide on its layer on prolonged exposure to moisture and has to be cleaned regularly. The aluminum foils may be secured to the wooden / plastic board via epoxy adhesive or small screws. The contact X and Y from the sensor may be obtained by small crocodile clips or you may use screws.

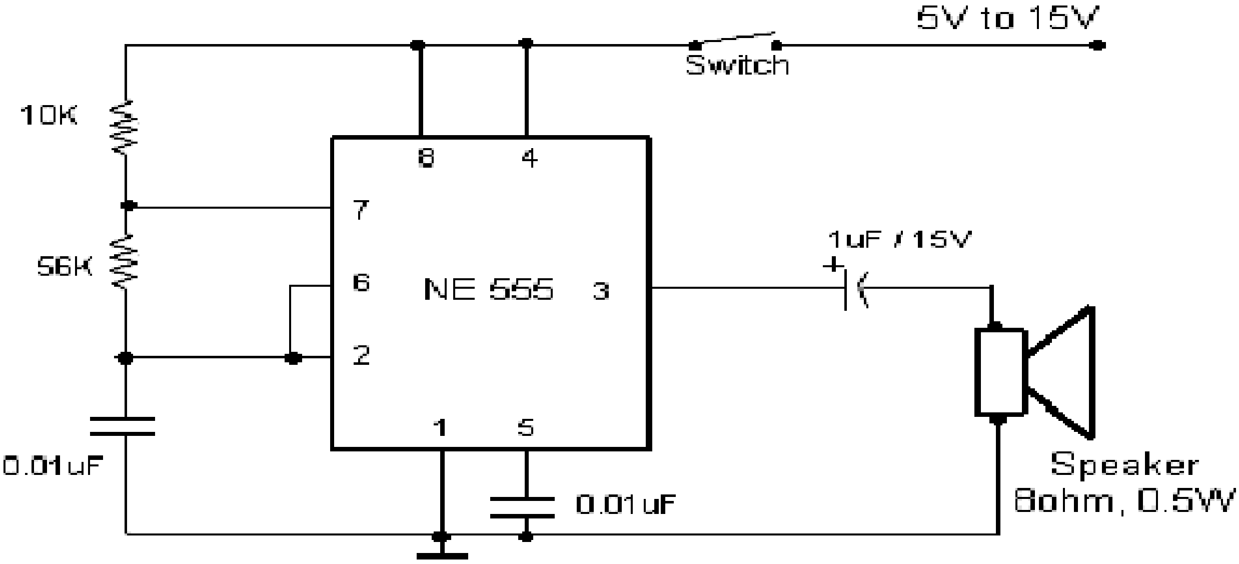



Water sensor
X
Gaps between the foils, about 3mm
Plastic OR wooden board
Aluminium foils about 5mm wide
Y

4- A simple electronic buzzer   دائرة جرس إليكتروني

دائرة بسيطة تتكون من الدائرة المتكاملة NE 555 حيث تعمل كمذبذب ومقاومتين ومكثفين . التردد الذي تنتجه ال ٥٥٥ يمكن تغييره بتغيير قيمة المقاومة 10k . التردد الناتج 1Khz والذي يعطي صوت الجرس عند غلق المفتاح .

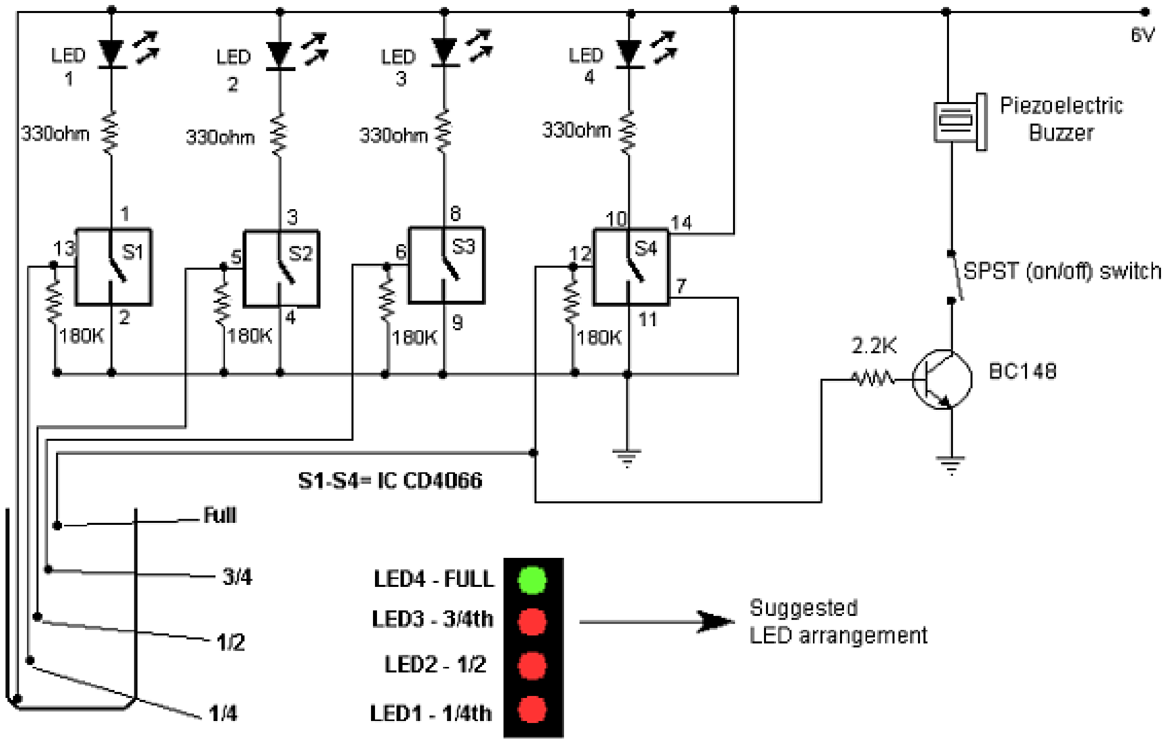
This very simple circuit just uses a couple of resistors, a capacitor and the easily available 555 timer IC.
The 555 is setup as an astable multi-vibrator operating at a frequency of about 1kHz that produces a shrill noise when switched on. The frequency can be changed by varying the 10K resistor.



5-Water Level Indicator with alarm دائرة توضيح مستوى الماء

هذه الدائرة لا تشير فقط إلى مستوى الماء في الإناء الحاوي له ولكن أيضا تعطي إنذار عند امتلاء هذا الإناء. في هذه الدائرة نستخدم الدائرة المتكاملة CD4066 واسعة الانتشار كمفتاح ثنائي الاتجاه لتوضيح مستوى الماء من خلال LEDs . في حالة عدم وجود ماء في الإناء فأن السلكيين الموضوعين فيه يكونا دائرة مفتوحة و لا تعمل الدائرة ولكن في حالة وجود الماء فأن الماء يوصل بين طرفي السلك و تبدأ الدائرة بإضاءة ال LED الأول وكلما أرتفع مستوى الماء كلما أضاء ال LED التالي إلى أن يمتلئ الإناء فيكون الترانزيستور BC148 في حالة تشبع ويطلق الإنذار .

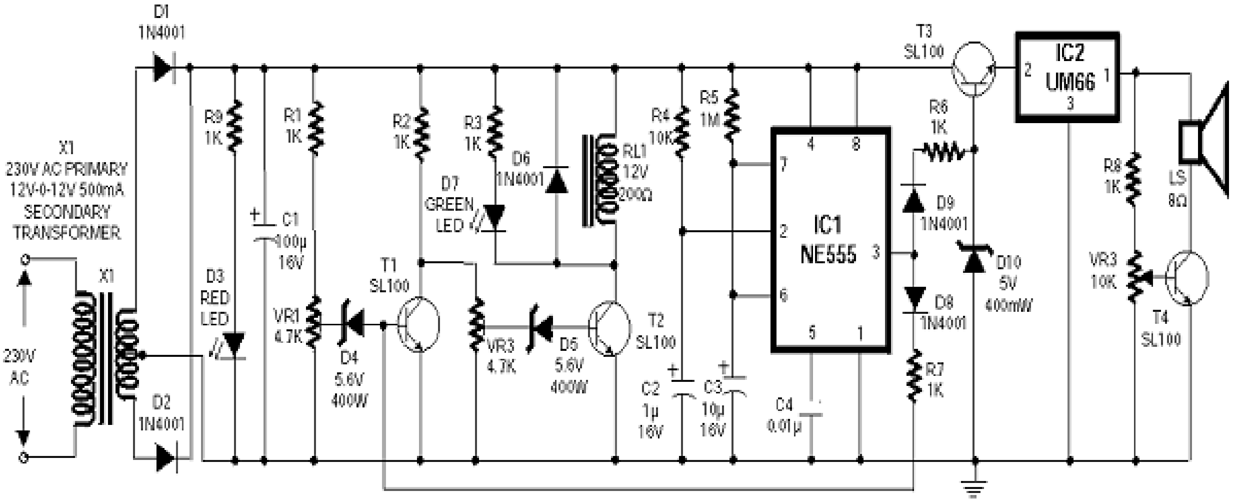
This circuit not only indicates the amount of water present in the overhead tank but also gives an alarm when the tank is full. The circuit uses the widely available CD4066, bilateral switch CMOS IC to indicate the water level through LEDs. When the water is empty the wires in the tank are open circuited and the 180K resistors pulls the switch low hence opening the switch and LEDs are OFF. As the water starts filling up, first the wire in the tank connected to S1 and the + supply are shorted by water. This closes the switch S1 and turns the LED1 ON. As the water continues to fill the tank, the LEDs2 , 3 and 4 light up gradually. The no. of levels of indication can be increased to 8 if 2 CD4066 ICs are used in a similar fashion. When the water is full, the base of the transistor BC148 is pulled high by the water and this saturates the transistor, turning the buzzer ON. The SPST switch has to be opened to turn the buzzer OFF. Remember to turn the switch ON while pumping water otherwise the buzzer will not sound!

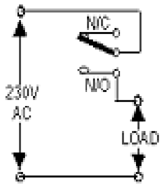


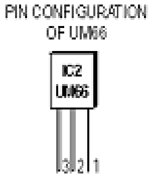
6- Melody generator for greeting cards دائرة مولد نغمات لبطاقات التهنئة

هذه الدائرة الصغيرة تحتوي على الدائرة المتكاملة **UM66** ولها ثلاثة أطراف. ومن الممكن أن تكون الدائرة حجمها صغير وتوضع داخل بطاقة التهنئة . وتعمل ببطارية مسطحة ٣ فولت. الخرج من **UM66** يدخل إلى الترانزيستور للتكبير ثم إلى السماعة ويمكن أن نستخدم سماعة ٤ اوم أو السماعة المسطحة .

This tiny circuit comprising of a single 3 terminal IC UM66 can be built small enough to be placed inside a greeting card and operated off a single 3V flat button cell.
There is not much to the circuit. The UM66 is connected to its supply and its output fed to a transistor for amplification. You can either use a 4ohm speaker or a " flat" piezoelectric tweeter like the one found in alarm wrist watches.
If you use the piezo, then it can be connected directly between the output pin 1 and ground pin 3 without the transistor.
The UM66 looks like a transistor with 3 terminals. It is a complete miniature tone generator with a ROM of 64 notes, oscillator and a preamplifier. When it first came into market, it was programmed for the "Jingle bells" tune. Now they come with a wide variety of different tunes.







7- 4 in 1 Burglar Alarm دائرة إنذار سرقة ٤ في ١

سوف تقوم الدائرة بإطلاق الإنذار في أربعة حالات مختلفة وهي

١- عند سقوط ضوء على LDR1

٢- عندما ينقطع الضوء الساقط على LDR2

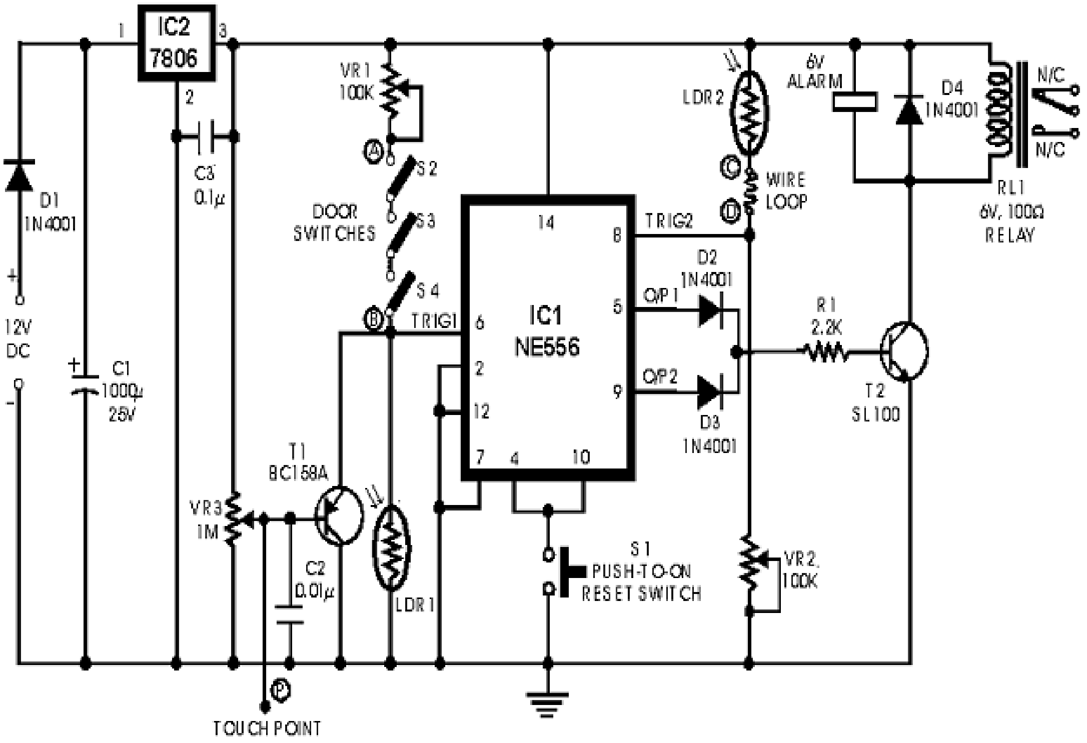
٣- عند فتح مفتاح الباب أو قطع السلك .

٤- الإظلام عند القفل أو مقبض الباب .

المقاومة المعتمدة على الضوء **LDR1** يجب أن توضع في الظلام عند مقبض الباب أو المفتاح بحيث إذا قام اللص بإشعال كشافه يسقط الضوء عليها فيقل فرق الجهد بين طرفيها وبالتالي الجهد المطبق على **IC1** مما يجعل الترانزيستور **T2** في الانحياز الأمامي ويقوم بتشغيل **RL1** الذي يقوم بتشغيل الإنذار . حساسية **LDR1** من الممكن التحكم فيها بواسطة المقاومة المتغيرة **VR1** . من الممكن وضع **LDR2** في ناحية من الممر بحيث يسقط عليها شعاع ضوء من مصدر الضوء و عند قطع اللص لهذا الشعاع ينتج فرق جهد على **LDR2** مما يزيد من فرق الجهد المطبق على **IC1** ويتم تشغيل الإنذار. ومن الممكن التحكم في حساسية **LDR2** عن طريق المقاومة المتغيرة **VR2** . ويوصل سلك طويل ولكن رفيع جدا بين النقطتين **A** و **B** أو النقطتين **C** و **D** ويوضع السلك بعرض الباب أو النافذة حيث إذا قام أي شخص بقطع السلك يتم تشغيل الإنذار .

In this circuit, the alarm will be switched on under the following four different conditions: 1. When light falls on LDR1 (at the entry to the premises). 2. When light falling on LDR2 is obstructed. 3. When door switches are opened or a wire is broken. 4. When a handle is touched. The light dependent resistor LDR1 should be placed in darkness near the door lock or handle etc. If an intruder flashes his torch, its light will fall on LDR1, reducing the voltage drop across it and so also the voltage applied to trigger 1 (pin 6) of IC1. Thus transistor T2 will get forward biased and relay RL1 energize and operate the alarm. Sensitivity of LDR1 can be adjusted by varying preset VR1. LDR2 may be placed on one side of a corridor such that the beam of light from a light source always falls on it. When an intruder passes through the corridor, his shadow falls on LDR2. As a result voltage drop across LDR2 increases and pin 8 of IC1 goes low while output pin 9 of IC1 goes high. Transistor T2 gets switched on and the relay operates to

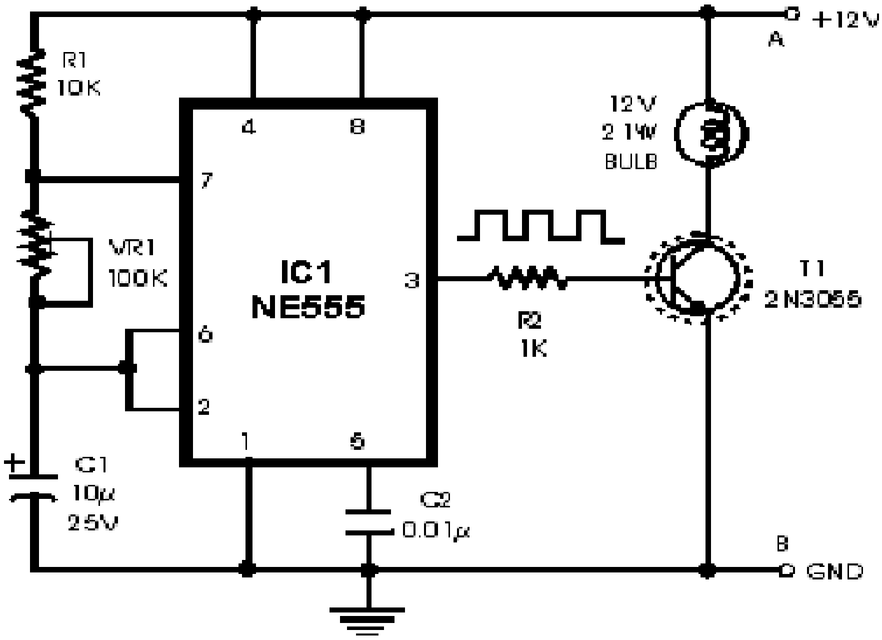
set the alarm. The sensitivity of LDR2 can be adjusted by varying potentiometer VR2. A long but very thin wire may be connected between the points A and B or C and D across a window or a door. This long wire may even be used to lock or tie something. If anyone cuts or breaks this wire, the alarm will be switched on as pin 8 or 6 will go low. In place of the wire between points A and B or C and D door switches can be connected. These switches should be fixed on the door in such a way that when the door is closed the switch gets closed and when the door is open the switch remains open. If the switches or wire, are not used between these points, the points should be shorted. With the help of a wire, connect the touch point (P) with the handle of a door or some other suitable object made of conducting material. When one touches this handle or the other connected object, pin 6 of IC1 goes 'low'. So the alarm and the relay gets switched on. Remember that the object connected to this touch point should be well insulated from ground. For good touch action, potentiometer VR3 should be properly adjusted. If potentiometer VR3 tapping is held more towards ground, the alarm will get switched on even without touching. In such a situation, the tapping should be raised. But the tapping point should not be raised too much as the touch action would then vanish. When you vary potentiometer VR1, re-adjust the sensitivity of the touch point with the help of potentiometer VR3 properly. If the alarm has a voltage rating of other than 6V (more than 6V), or if it draws a high current (more than 150 mA), connect it through the relay points as shown by the dotted lines. As a burglar alarm, battery backup is necessary for this circuit. Note: Electric sparking in the vicinity of this circuit may cause false triggering of the circuit. To avoid this adjust potentiometer VR3 properly.



8- Brake light Flasher دائرة فلاشر

هذه الدائرة مصممة على فتح وغلق الصمام بدلا من ال LED . ونستخدم فيها الدائرة المتكاملة NE 555 كمذبذب ويمكن التحكم
في التردد الذي تنتجه أي في سرعة فتح وغلق الصمام من خلال المقاومة المتغيرة VR1 .

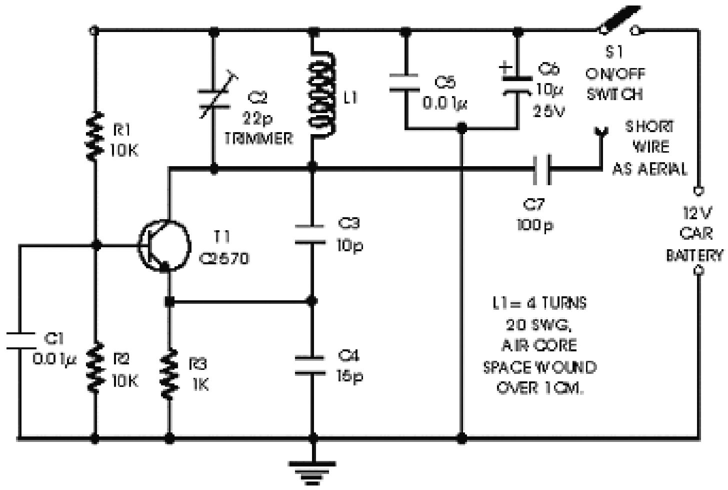
This is basically a flasher circuit modified to turn on and off a bulb instead of a LED. It uses a 555 timer IC working as an astable multi-vibrator. The flashing rate can be varied from very fast to a maximum of once in 1.5 sec by varying the preset VR1.The ON time of the circuit is given by: TON= 0.69xC1x(R1 + VR1) second and the OFF time is:TOFF= 0.69xC1xVR1 second You can increase the value of C1 to 100uF to get a slower flashing rate of up to once in 10 sec.

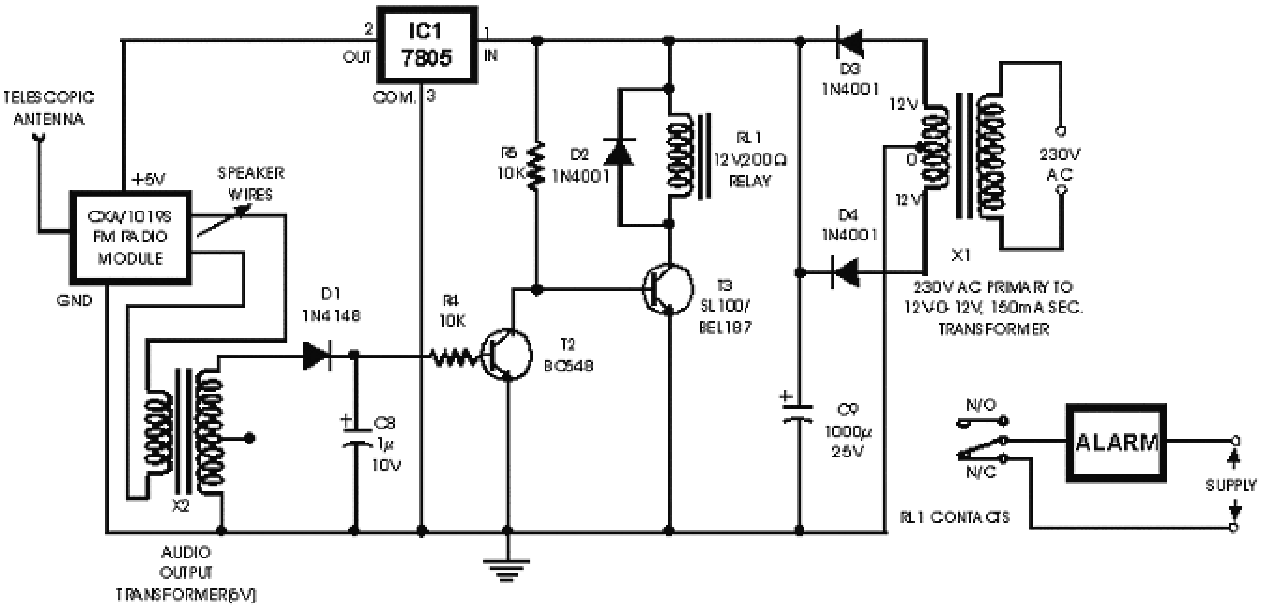


9- Car anti theft wireless alarm   دائرة إنذار سيارة لاسلكى

يمكن استخدام هذه الدائرة مع أي مركبة بها مصدر جهد من ٦ فولت إلى ١٢ فولت . ونقوم بتثبيت دائرة الإرسال في السيارة ونحتفظ بدائرة الاستقبال معنا ويتم تنغيم دائرة الإرسال مع دائرة الاستقبال ويمكن استقبال دائرة الإرسال باستخدام راديو FM .

This FM radio-controlled anti- theft alarm can be used with any vehicle having 6- to 12-volt DC supply system. The mini VHF, FM transmitter is fitted in the vehicle at night when it is parked in the car porch or car park. The receiver unit with CXA1019, a single IC-based FM radio module, which is freely available in the market at reasonable rate, is kept inside. Receiver is tuned to the transmitter's frequency. When the transmitter is on and the signals are being received by FM radio receiver, no hissing noise is available at the output of receiver. Thus transistor T2 (BC548) does not conduct. This results in the relay driver transistor T3 getting its forward base bias via 10k resistor R5 and the relay gets energized. When an intruder tries to drive the car and takes it a few meters away from the car porch, the radio link between the car (transmitter) and alarm (receiver) is broken. As a result FM radio module gene-rates hissing noise. Hissing AC signals are coupled to relay switching circ- uit via audio transformer. These AC signals are rectified and filtered by diode D1 and capacitor C8, and the resulting positive DC voltage provides a forward bias to transistor T2. Thus transistor T2 conducts, and it pulls the base of relay driver transistor T3 to ground level. The relay thus gets de-activated and the alarm connected via N/C contacts of relay is switched on. If, by chance, the intruder finds out about the wireless alarm and disconnects the transmitter from battery, still remote alarm remains activated because in the absence of signal, the receiver continues to produce hissing noise at its output. So the burglar alarm is fool-proof and highly reliable.





10- Fire Alarm دائرة إنذار حريق

هذه الدائرة تقوم بإنذار مستخدمها في حالة وجود حريق وهي تدرك الدخان الناتج في حالة الحرائق فعند مرور هذا الدخان بين الصمام والمقاومة المعتمدة على الضوء LDR فان كمية الضوء الساقط على عليها تقل مما يزيد من مقاومتها ويزدد الجهد على قاعدة الترانزيستور والذي يقوم بتشغيل دائرة الإنذار.

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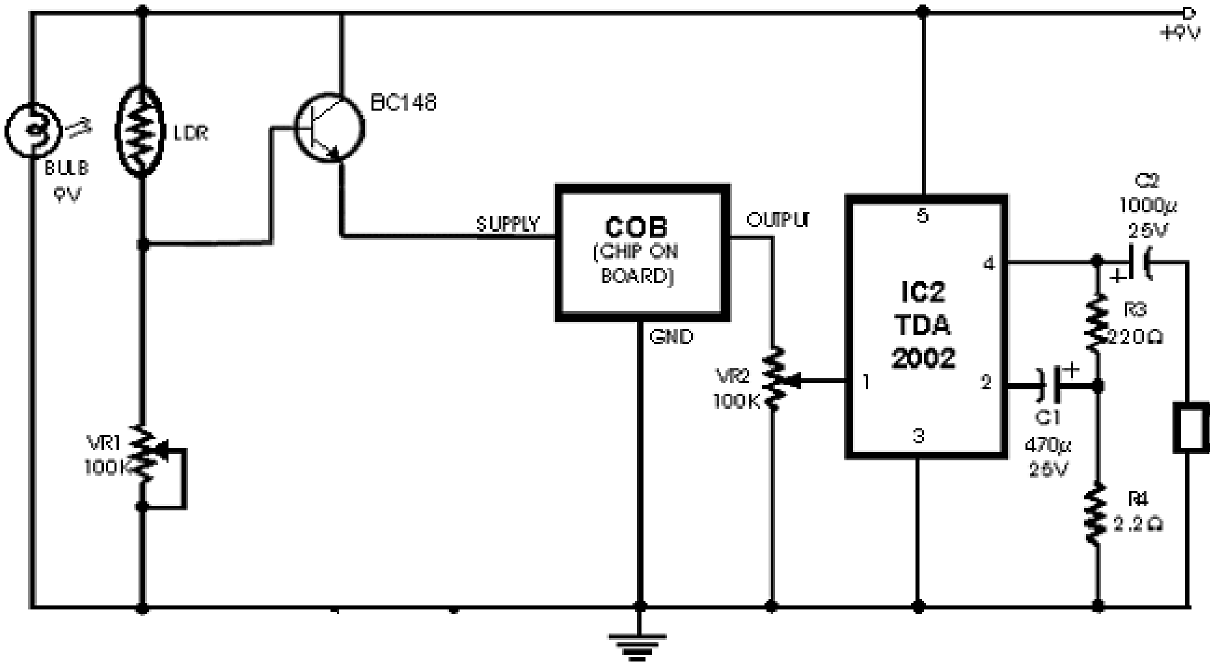
This circuit warns the user against fire accidents. It relies on the smoke that is produced in the event of a fire. When this smoke passes between a bulb and an LDR, the amount of light falling on the LDR decreases. This causes the resistance of LDR to increase and the voltage at the base of the transistor is pulled high due to which the supply to the COB (chip-on-board) is completed. Different COBs are available in the market to generate different sounds.

The choice of the COB depends on the user. The signal generated by COB is amplified by an audio amplifier. In this circuit, the audio power amplifier is wired around IC TDA 2002. The sensitivity of the circuit depends on the distance between bulb and LDR as well as setting of preset VR1. Thus by placing the bulb and the LDR at appropriate distances, one may vary preset VR1 to get optimum sensitivity. An ON/OFF switch is suggested to turn the circuit on and off as desirable



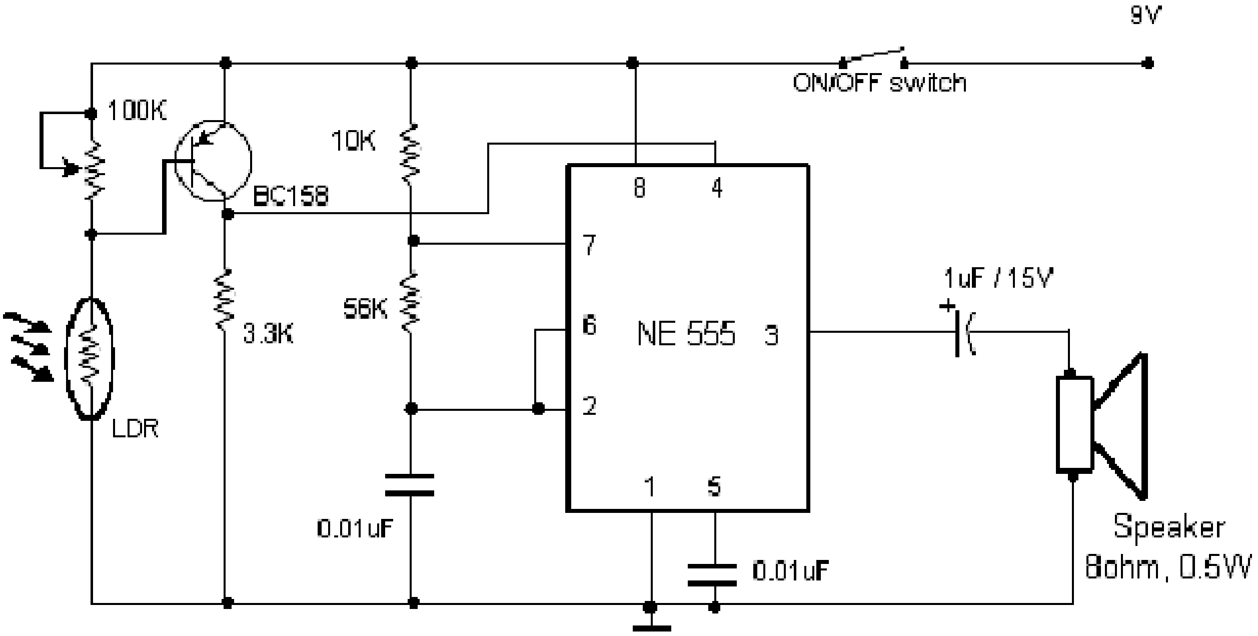
11- Daylight Alarm جرس إنذار ضوء الشمس

تقوم الدائرة بإيقاظ المستخدم عند سطوع ضوء الشمس . ونستخدم فيها الدائرة المتكاملة NE 555 لإنتاج نغمة مترددة بتردد 1Khz . عند عدم سقوط أي ضوء على المقاومة الحساسة للضوء LDR يكون الترانزيستور مغلق وعند سقوط الضوء عليها تقوم بتشغيل الترانزيستور الذي يقوم بتشغيل الإنذار.

The circuit presented here wakes you up with a loud alarm at the break of the daylight. Once again the 555 timer is used here. It is working as an astable multi-vibrator at a frequency of about 1kHz.The circuit's operation can be explained as follows:

When no light falls on the LDR, the transistor is pulled high by the variable resistor. Hence the transistor is OFF and the reset pin of the 555 is pulled low. Due the this the 555 is reset.

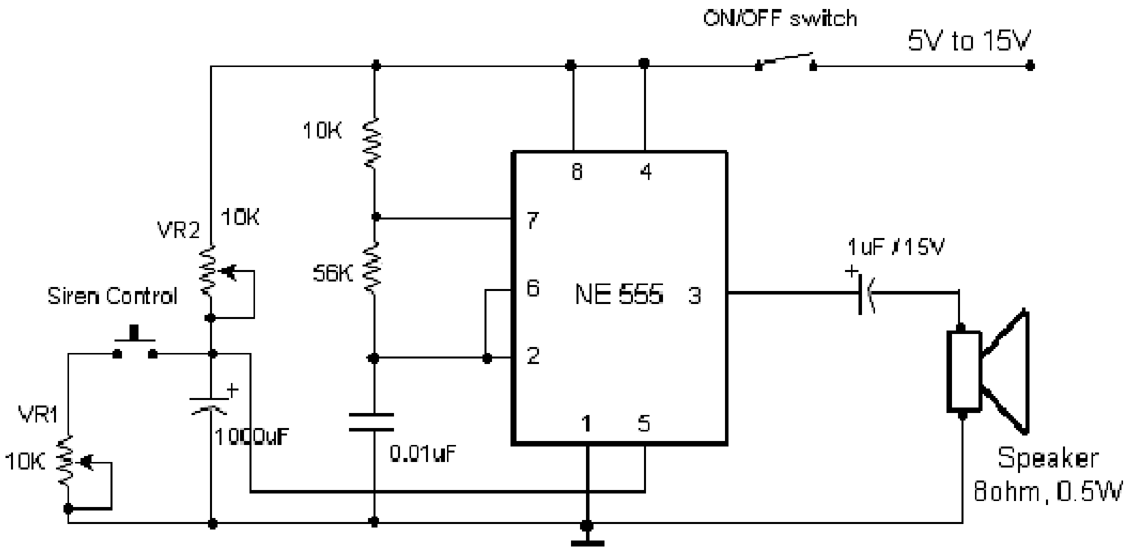
When light falls on the LDR, its resistance decreases and pulls the base of the transistor low hence turning it ON. This pulls the reset pin 4 of the 555 high and hence enables the 555 oscillator and a sound is produced by the speaker. The variable 100K resistor has to be adjusted to set the light intensity that triggers the alarm.



12- Factory Siren سرينة مصنع

هذه الدائرة تنتج صوت سرينة المصنع وتعتمد على الدائرة المتكاملة NE 555 التي تنتج نغمة مترددة بتردد 300HZ والتردد يتم التحكم فيه عن طريق الرجل رقم ٥ في ال٥٥٥ . وللحصول على افضل نعمة يجب ضبط كلا من VR1 و VR2 .

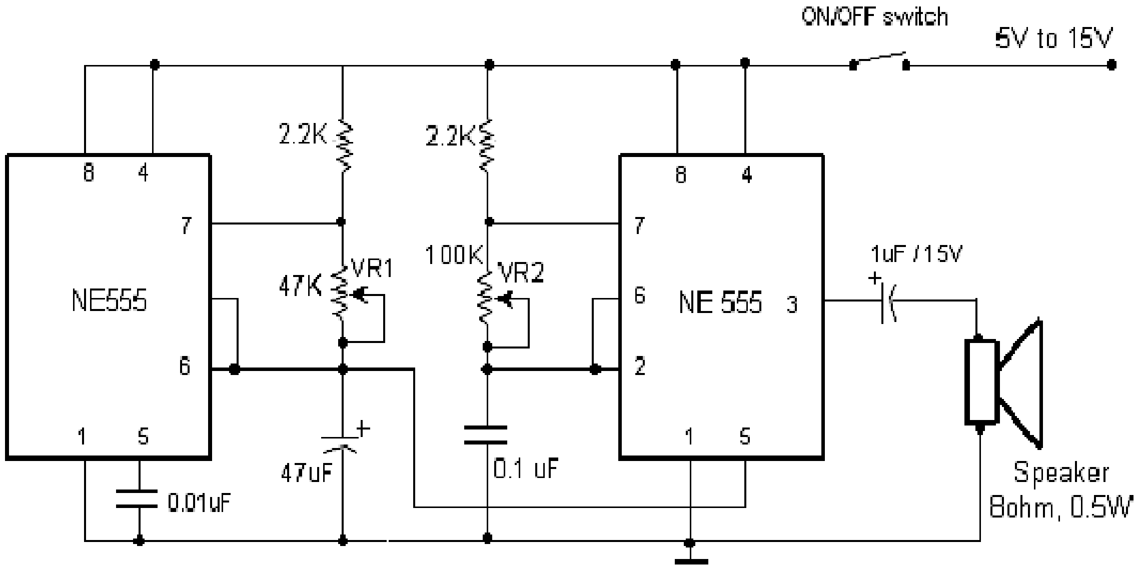
This circuit produces a sound similar to a factory siren. It makes use of a 555 timer Ic used as an astable multi-vibrator of a center frequency of about 300Hz.The frequency is controlled by the pin 5 of the IC. When the supply is switched ON, the capacitor charges slowly and this alters the voltage at pin 5 of the IC hence the frequency gradually increases. After the capacitor is fully charged, the frequency no longer increases. Now when the push button siren control switch is held depressed, the capacitor discharges and the siren frequency also decreases. The presets VR1 and VR2 should be adjusted for optimum performance.



13- Police Siren سرينة الشرطة

هذه الدائرة تنتج صوت سرينة الشرطة باستخدام دائرتين متكاملتين من ال NE555 حيث تنتج الأولي نغمة مترددة بتردد 1HZ وأيضا تتحكم في التردد الذي تنتجه الثانية. كما يمكن التحكم في تردد كلا من الدائرتين المتكاملتين باستخدام المقاومتين VR1 و VR2 .

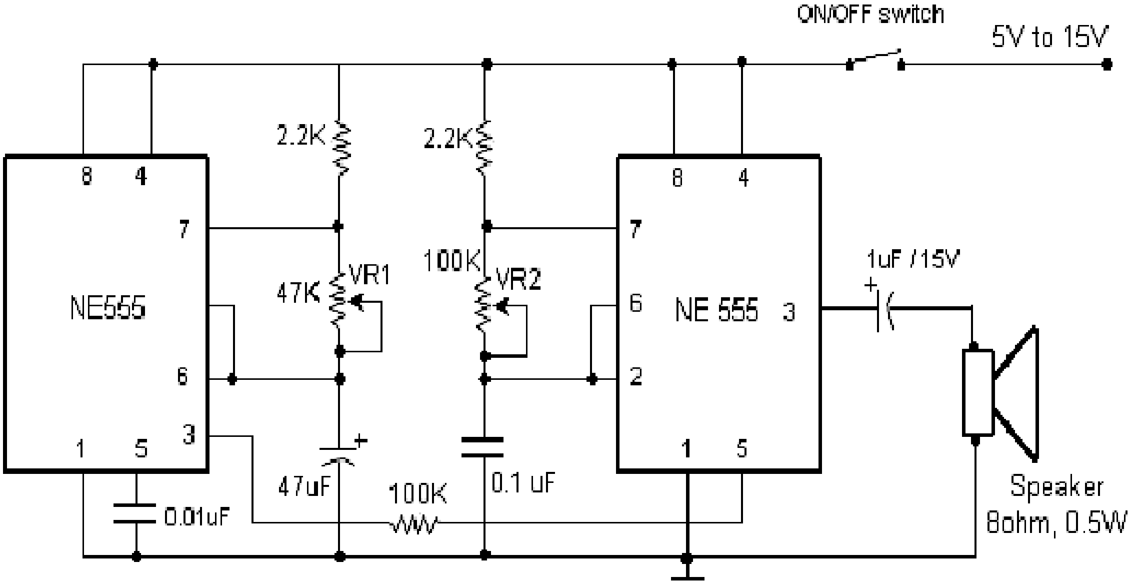
This circuit produces a sound similar to the police siren. It makes use of two 555 timer ICs used as astable multi-vibrators. The frequency is controlled by the pin 5 of the IC. The first IC (left) is wired to work around 1Hz. The 47uF capacitor is charged and discharged periodically and the voltage across it gradually increases and decreases periodically. This varying voltage modulates the frequency of the 2nd IC. This process repeats and what you hear is the sound remarkably similar to the police siren. Two presets VR1 and VR2 are provided to vary the siren period of repetition and the tone of the siren. By varying VR1 you can set how fast the siren changes from high freq. to low freq.VR2 sets the siren frequency. Adjust VR1 and VR2 to suit your taste.



14-Big Ben Sound صوت ساعة بيج بين

هذه الدائرة تنتج صوت ساعة بيج بين وتتردد الدائرة بترددين يمكن التحكم فيهم . الدائرة المتكاملة الأولي (يسارا) تتذبذب بتردد 1HZ والدائرة المتكاملة الثانية يعتمد ترددها على الأولى . ويمكن التحكم فيهما بالمقاومات المتغيرة VR1 و VR2 .

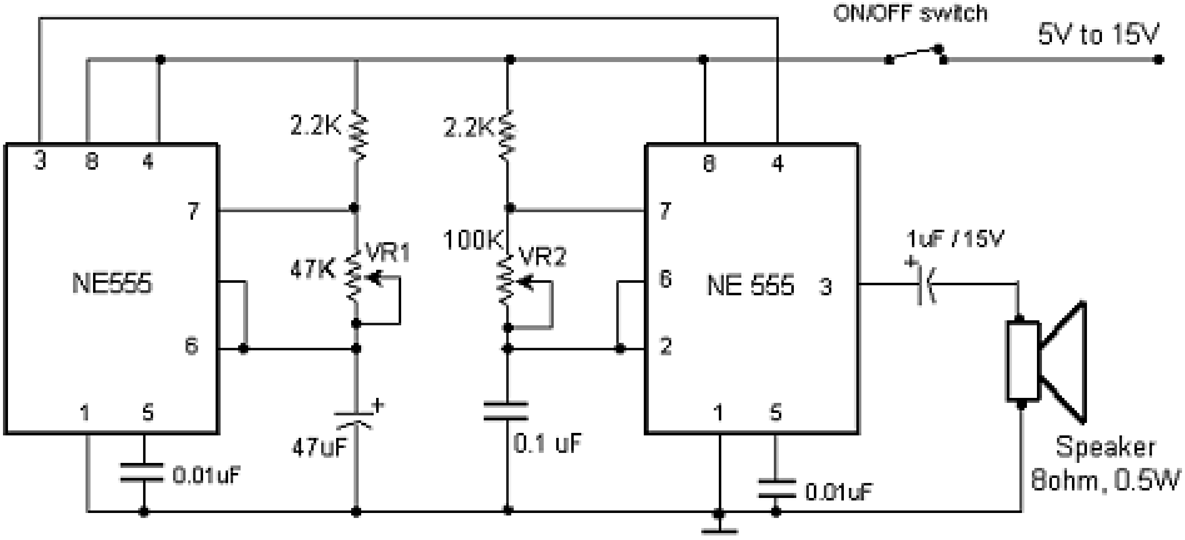
This circuit produces the famous Big Ben sound. It produces the "ding dong" sound when switched ON. Basically the circuit alternates between two frequencies which are adjustable. This produces the "ding-dong" sound. The first IC(left) oscillates at about 1Hz. The second IC's tone is modulated by the changing voltage at the output of the first IC. The first IC determines how fast the changeover from one frequency to the other takes place and second IC determines the tone of the final output. By varying the VR1, the changeover rate can be adjusted. By varying VR2 the tone can be adjusted.



15- Beeper

هذه الدائرة تنتج صوت ال **beeper** وتعتمد على الدائرة المتكاملة **NE 555** كمذبذب زمني والتي تقوم بعمليتي الفتح والغلق بانتظام بتردد **1HZ** ودائرة ال ٥٥٥ الثانية تقوم بعمليتي الفتح والغلق بناء على الدائرة الأولى . وبالتغيير في المقاومة المتغيرة **VR1** معدل التغير يمكن التحكم فيه وبتغيير المقاومة المتغيرة **VR2** يمكن التحكم في النغمة.

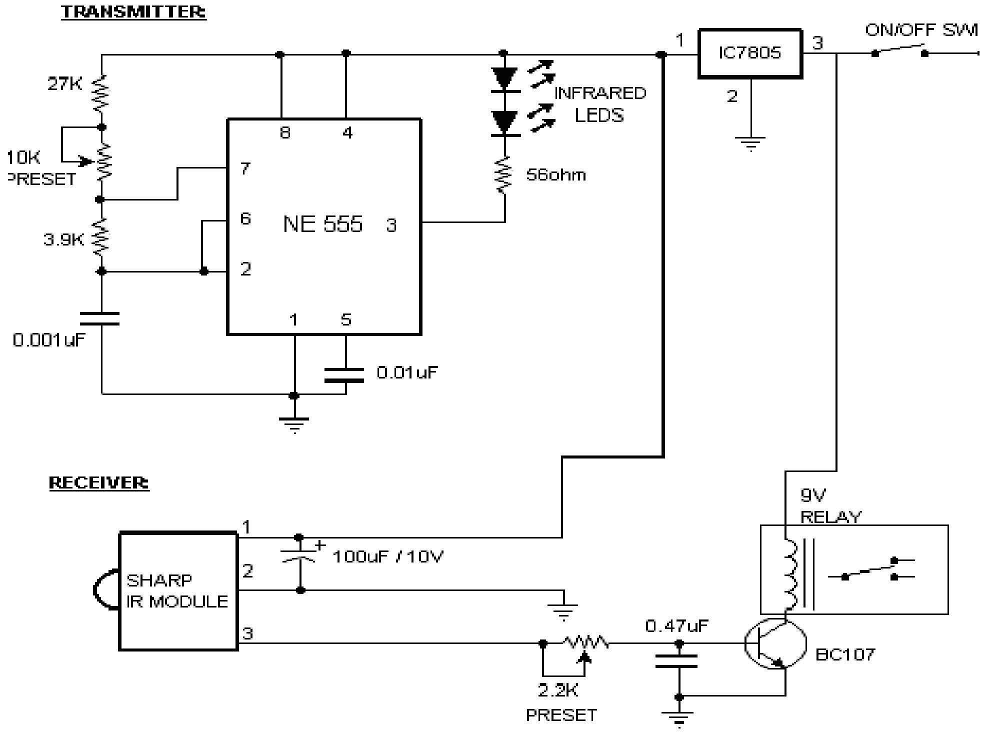
This circuit produces the sound of a beeper like the one in pagers which produces a "beep-beep" sound. Basically the circuit consists of a 555 timer oscillator which is turned ON and OFF periodically. The first IC(left) oscillates at about 1Hz. The second IC is turned ON and OFF by the first IC. The first IC determines how fast the second IC is turned ON/OFF and second IC determines the tone of the final output. By varying the VR1, the changeover rate can be adjusted. By varying VR2 the tone can be adjusted. If you know something about electronics, you can try replacing the 2nd 555 IC circuit with a piezoelectric buzzer. This saves one IC and associated components but the buzzer cannot give a loud sound as the speaker and also its tone cannot be varied.

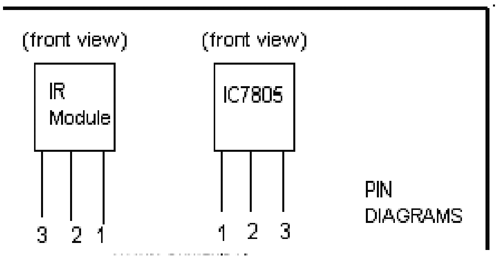


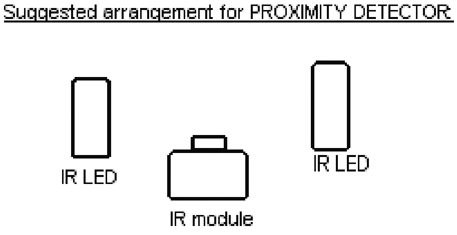
16- Infrared beam barrier/ proximity sensor دائرة مانع ضوئى

تستخدم هذه الدائرة كدائرة مانع ضوئي كما يمكن استخدامها كمستشعر لاقتراب الأشياء من ال sensor . وتستخدم الدائرة المتكاملة NE 555 في إنتاج نغمة مترددة بتردد 38Khz . والتردد يجب أن يضبط باستخدام المقاومة المتغيرة 10K . الدورة الزمنية للأشعة تحت الحمراء ١٠% مما يسمح لتيار اكبر بالمرور في ال LEDs ما يعطي مدى اكبر للدائرة .

This circuit can be used as an Infrared beam barrier as well as a proximity detector. The circuit uses the very popular Sharp IR module. The pin nos. shown in the circuit are for the Sharp module only. For other modules please refer to their respective datasheets. The receiver consists of a 555 timer IC working as an oscillator at about 38Khz which has to be adjusted using the 10K preset. The duty cycle of the IR beam is about 10%. This allows us to pass more current through the LEDS thus achieving a longer range. The receiver uses a sharp IR module. When the IR beam from the transmitter falls on the IR module, the output is activated which activates the relay and de-activated when the beam is obstructed. The relay contacts can be used to turn ON/OFF alarms, lights etc. The 10K preset should be adjusted until the receiver detects the IR beam. The circuit can also be used as a proximity sensor, i.e. to detect objects in front of the device without obstructing a IR beam. For this the LEDs should be pointed in the same direction as the IR module and at the same level. The suggested arrangement is shown in the circuit diagram. The LEDs should be properly covered with a reflective material like glass or aluminum foils on the sides to avoid the spreading of the IR beam and to get a sharp focus of the beam. When there is nothing in front of them, the IR beam is not reflected onto the module and hence the circuit is not activated. When an object comes near the device, the IR light from the LEDs is reflected by the object onto the module and hence the circuit gets activated. The 2.2K preset is used to adjust the sensitivity of the receiver. If the relay is trigger by noise, adjust the 2.2K preset to its maximum. If there still a lot of miss-triggering, use a 1uF or higher capacitor instead of the 0.47uF.







17- gate alarm إنذار بوابة

تتكون الدائرة من **IC1a** التي تتذبذب بتردد عالي (بسرعة) و**IC1b** التي تتذبذب بتردد منخفض (ببطء) و يتصل خرج كلا منهما بالدائرة المتكاملة **IC1c** التي تقوم بتشغيل صوت الإنذار (صوت يشبه صوت السرينة) . ويمكن أن نغير في الصوت الذي تنتجه الدائرة بحذف المقاومة **R1** و الدايود **D1** وتقليل قيمة المقاومة **R2** كما تتحكم المقاومة المتغيرة **VR1** في تردد الصوت الناتج من الدائرة . و **IC1d** عبارة عن ميقاتي تجعل الدائرة تستمر في تشغيل صوت الإنذار من ٢٠ مرة إلى ٣٠ مرة بعد غلق البوابة مرة أخرى .

Figure 1 represents a cheap and simple Gate Alarm, that is intended to run off a small universal AC-DC power supply. IC1a is a fast oscillator, and IC1b a slow oscillator, which are combined through IC1c to emit a high pip-pip-pip warning sound when a gate (or window, etc.) is opened. The circuit is intended not so much to sound like a siren or warning device, but rather to give the impression: "You have been noticed." R1 and D1 may be omitted, and the value of R2 perhaps reduced, to make the Gate Alarm sound more like a warning device. VR1 adjusts the frequency of the sound emitted. IC1d is a timer which causes the Gate Alarm to emit some 20 to 30 further pips after the gate has been closed again, before it falls silent, as if to say: "I'm more clever than a simple on-off device." Piezo disk S1 may be replaced with a LED if desired, the LED being wired in series with a 1K resistor. Figure 2 shows how an ordinary reed switch may be converted to close (a "normally closed" switch) when the gate is opened. A continuity tester makes the work easy. Note that many reed switches are delicate, and therefore wires which are soldered to the reed switch should not be flexed at all near the switch. Other types of switches, such as micro switches, may also be used.

Gate Alarm.

Figure 1.

Copyright © by Rev. Thomas Scarborough.

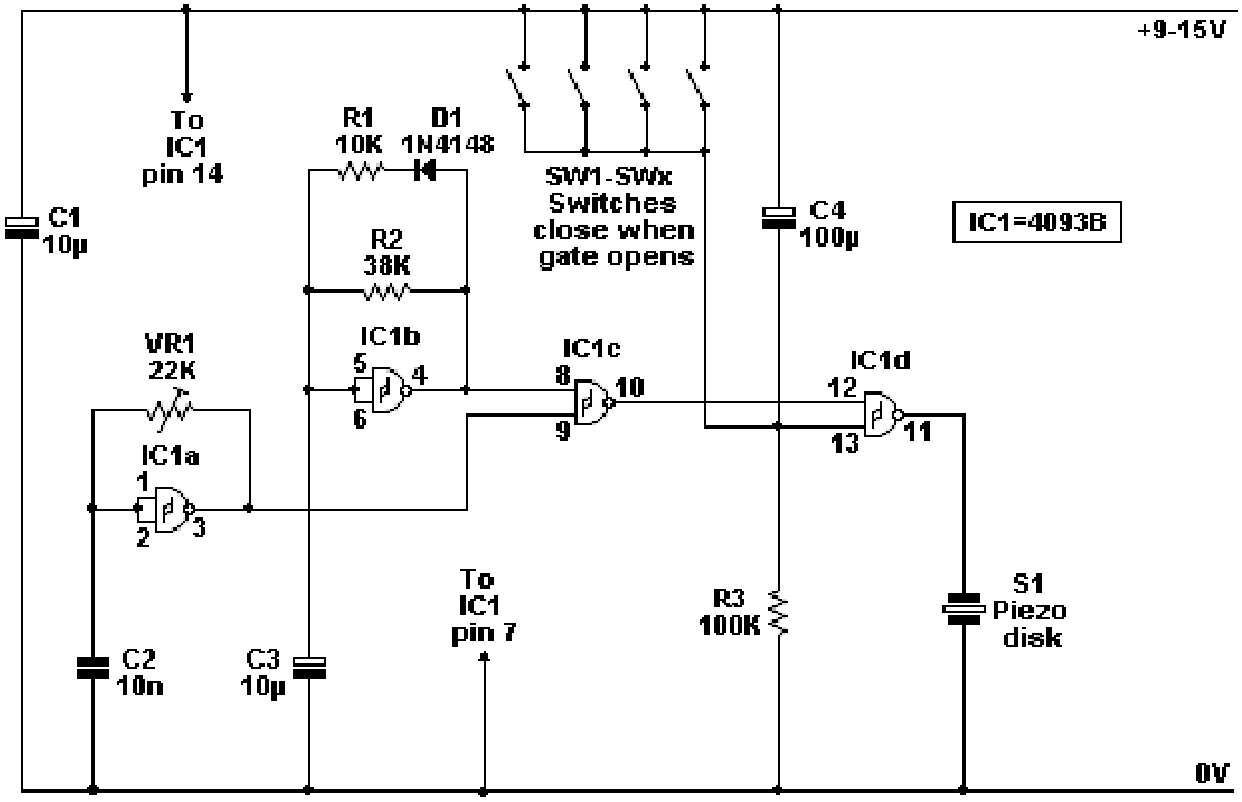
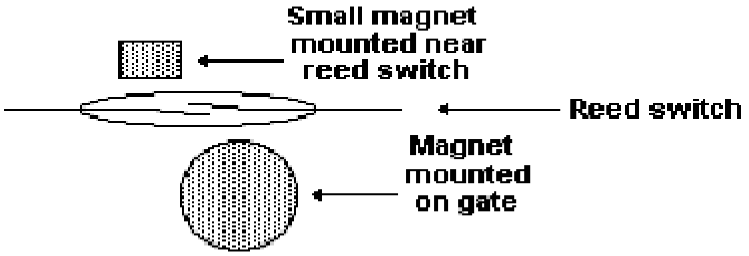


Figure 2.

"Normally closed"
reed switch

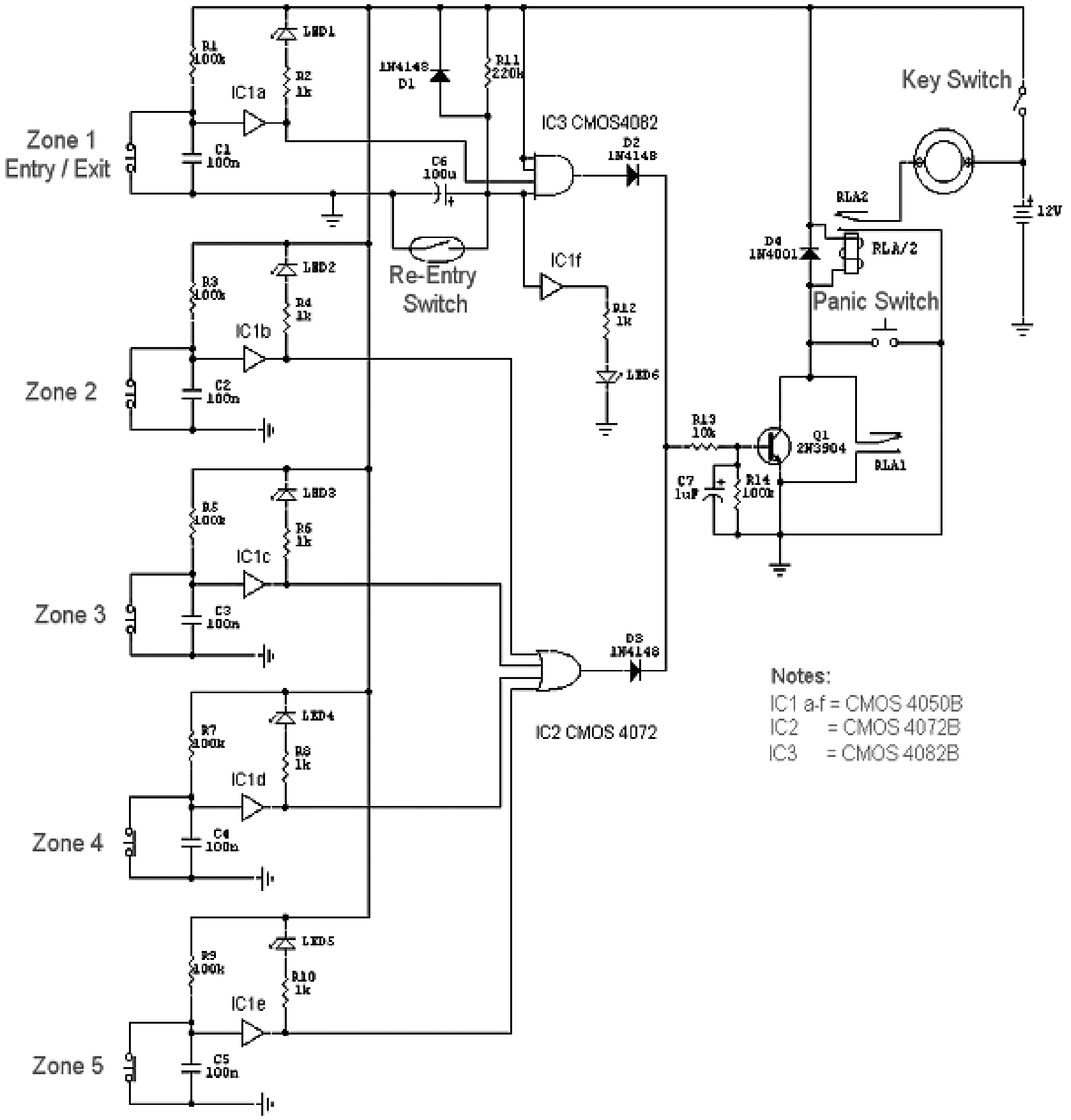


18- 5 Zone Alarm System نظام إنذار لخمسة مناطق

نظام متكامل للإنذار يمكنه التحكم في خمسة مناطق منفصلة . ويتكون من ثلاثة دوائر متكاملة CMOS . ويوجد به مبين لكل منطقة من مناطق المراقبة.

Description

This is a complete alarm system with 5 independent zones suitable for a small office or home environment. It uses just 3 CMOS IC's and features a timed entry / exit zone, 4 immediate zones and a panic button. There are indicators for each zone a "system armed" indicator. The schematic is as follows:



Circuit Notes:

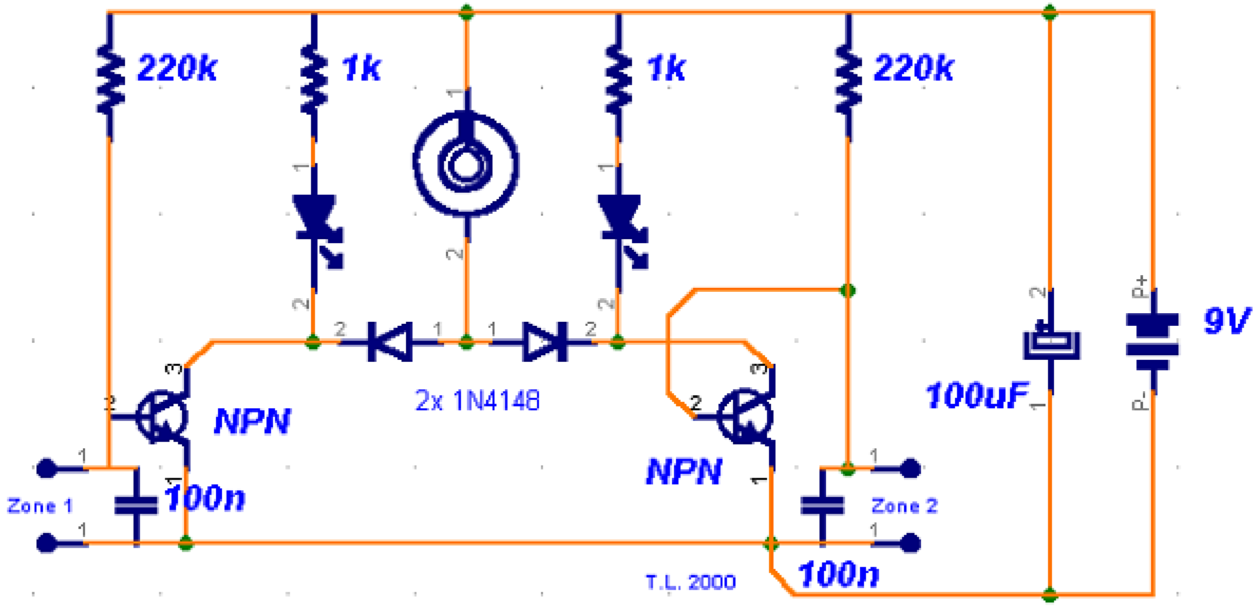
Each zone uses a normally closed contact. These can be micro switches or standard alarm contacts (usually reed switches). Zone 1 is a timed zone which must be used as the entry and exit point of the building. Zones 2 - 5 are immediate zones, which will trigger the alarm with no delay. Some RF immunity is provided for long wiring runs by the input capacitors, C1-C5. C7 and R14 also form a transient suppresser. The key switch acts as the Set/Unset and Reset switch. For good security this should be the metal type with a key. At switch on, C6 will charge via R11, this acts as the exit delay and is set to around 30 seconds. This can be altered by varying either C6 or R11. Once the timing period has elapsed, LED6 will light, meaning the system is armed. LED6 may be mounted externally (at the bell box for example) and provides visual indication that the system has set. Once set any contact that opens will trigger the alarm, including Zone 1. To prevent triggering the alarm on entry to the building, the concealed re-entry switch must be operated. This will discharge C6 and start the entry timer. The re-entry switch could be a concealed reed switch, located anywhere in a door frame, but

invisible to the eye. The panic switch, when pressed, will trigger the alarm when set. Relay contacts RLA1 provide the latch, RLA2 operate the siren or buzzer.

19- Miniature Loop Alarm دائرة إنذار صغيرة

تتسم الدائرة بالبساطة في التصميم والكفاءة في الأداء وتقليلها لاستهلاك الطاقة وصغر الحجم . وتتكون من دائرتي فتح وغلق باستخدام الترانزيستور .

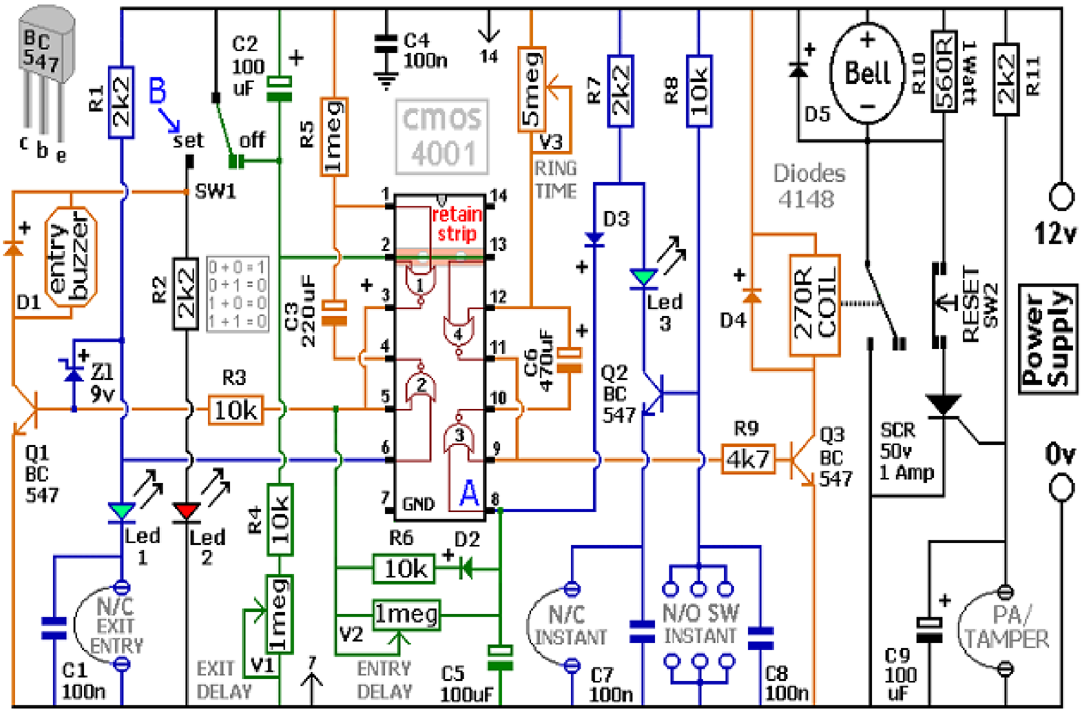
A few months ago, I decided to build a compact, yet effective alarm. My demands were:- simple construction, reliable operation, very small power consumption, and, most of all, small size. I started with CMOS logic gates, but was soon forced to abandon the concept after a few unsuccessful (and far too complicated) attempts. Then I suddenly realized that a simple transistor switch might do the job and I was right.



As you can clearly see from the schematics, the circuit is utterly primitive and consists of two identical transistor switches. Each has its own alarm LED and they're coupled to a neat 82dB buzzer. The two 1N4148 diodes are used to prevent a signal from one sensor from triggering both LEDs. The sensors used are either wire loops or normally closed reed switches or even a combination of both. You could, for example, tie a wire loop to your suitcase and place a reed switch to the door of your hotel room. Since this little alarm is intended to be kept in arms reach at all times, there aren't any provisions for automatic shutdown after a certain period of time. The buzzer will sound until you turn the whole circuit off or connect the wire loop back to the jumpers. The same goes for the two LEDs, each indicating its own zone. Construction is not critical and there aren't any traps for the novice. The two 100n capacitors aren't really necessary, I just included them to make sure that there is no noise interference coming from the long wire loops. For transistors, you can use any NPN general-purpose audio amplifiers/switches (BC 107/108/109, BC 237/238, 2N2222, 2N3904...). Assemble the circuit on perf board. Together with the buzzer and a 9V battery, it should easily fit in a pocket-sized plastic box smaller than a pack of cigarettes. A fresh battery should suffice for weeks of continuous operation.

20- Modular Burglar Alarm نظام إنذار ضد السرقة

Modular Burglar Alarm

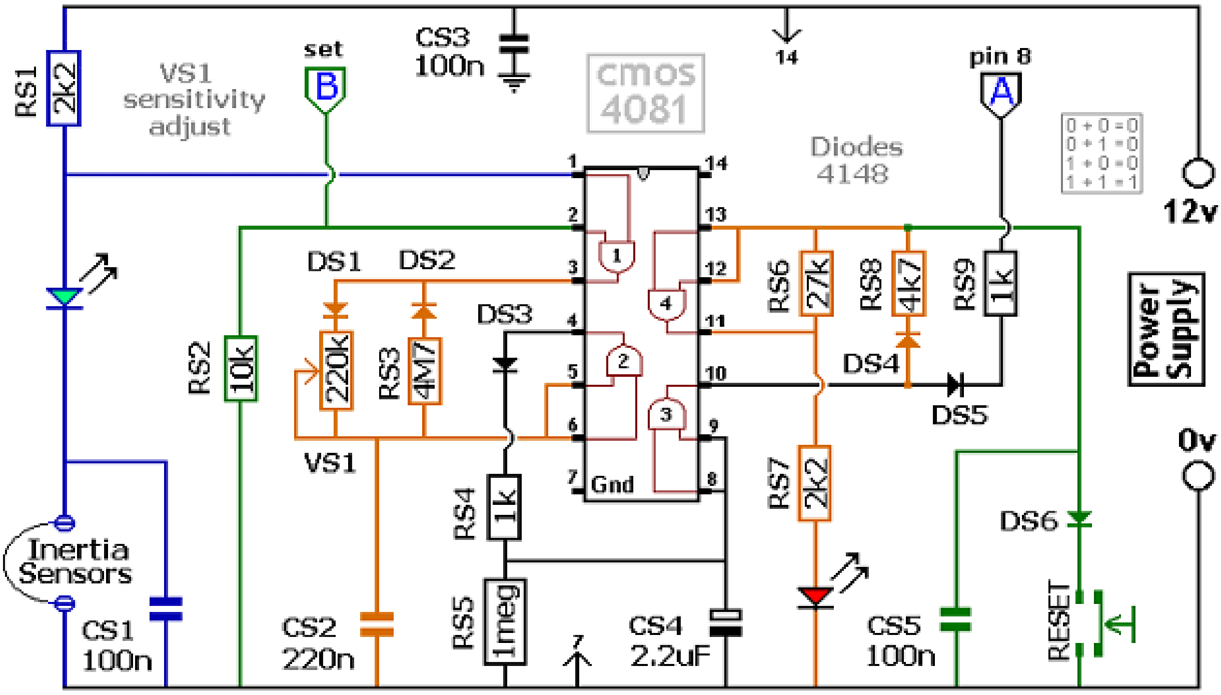


نظام مراقبة الدخول والخروج من البوابات. تعمل الدائرة بمصدر جهد ١٢ فولت وتعمل بفتح المفتاح SW1 ويمكن زيادة عدد مناطق المراقبة بإضافة دوائر جديدة للدائرة الأصلية .

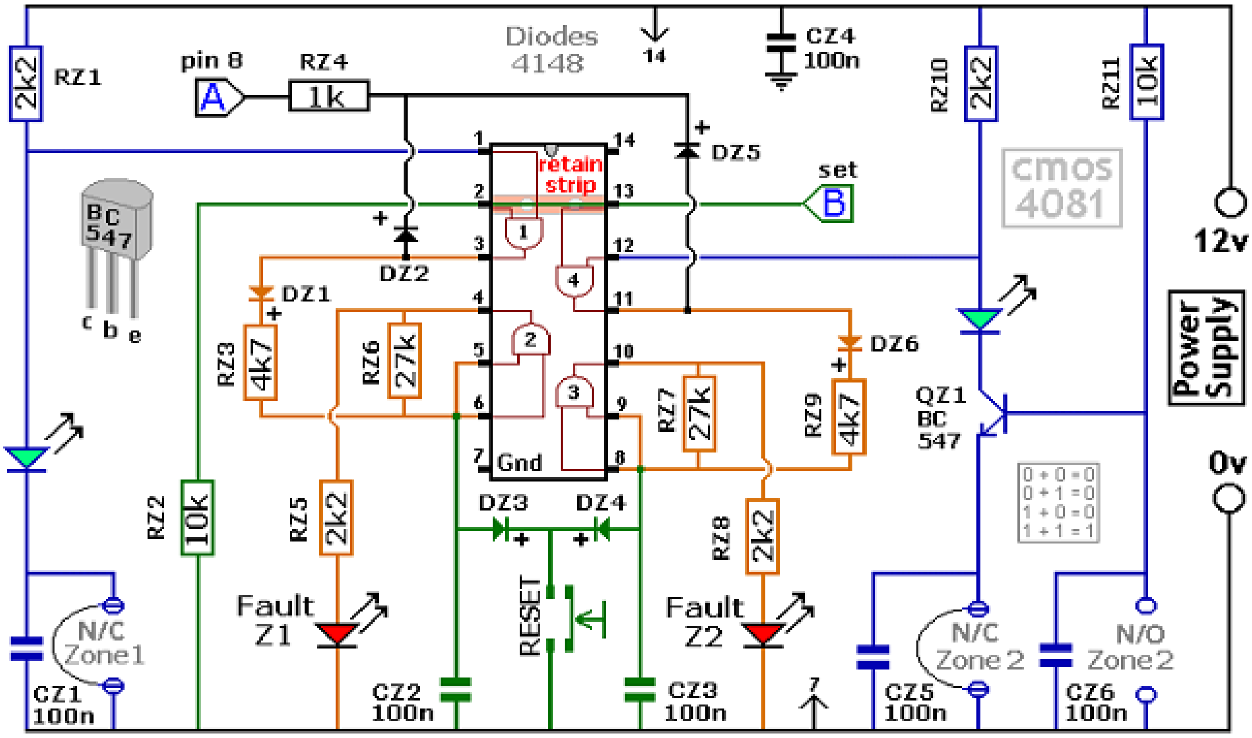
This circuit features automatic Exit and Entry delays and a timed Bell Cut-off. It has provision for both normally-closed and normally-open contacts, and a 24-hour Personal Attack/Tamper zone. It is connected permanently to the 12-volt supply and its operation is "enabled" by opening SW1. By using the expansion modules, you can add as many zones as you require; some or all of which may be the inertia (shock) sensor type. All the green LEDs should be lighting before you open SW1. You then have up to about a minute to leave the building. As you do so, the Buzzer will sound. It should stop sounding when you shut the door behind you. This indicates that the Exit/Entry loop has been successfully restored within the time allowed. When you re-enter the building you have up to about a minute to move SW1 to the off position. If SW1 is not switched off in time, the relay will energies and sound the main bell. It will ring for up to about 40 minutes. But it can be turned off at any time by SW1. The "Instant" zone has no Entry Delay. If you don't want to use N/O switches, leave out R8, C8 and Q2; and fit a link between Led 3 and C7. The 24 Hour PA/Tamper protection is provided by the SCR/ Thyristor. If any of the switches in the N/C loop is opened, R11 will trigger the SCR and the bell will ring. In this case the bell has no time limit. Once the loop is closed again, the SCR may be reset by pressing SW2 and temporarily interrupting the current flow. The basic circuit will be satisfactory in many situations. However, it's much easier to find a fault when the alarm is divided into zones and the control panel can remember which zone has caused the activation. The expansion modules are designed to do this. Although they will work with the existing instant zone, they are intended to replace it.

When a zone is activated, its red LED will light and remain lit until the reset button is pressed. All the modules can share a single reset button. The Strip board layout of the prototype is available.

Inertia Sensor Module



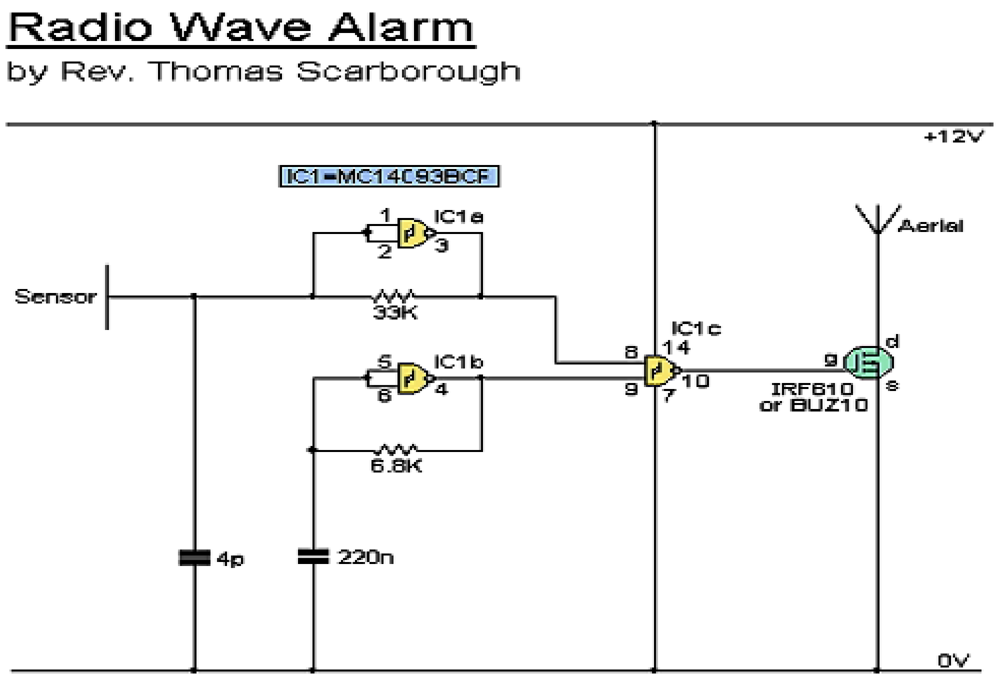
Two Zone Module



21- Radio Wave Alarm دائرة إنذار ضد أشعة الراديو

من الممكن أن تستخدم هذه الدائرة لمعرفة اقتراب رجال الشرطة قبل وجودهم. حيث تقوم الدائرة بإرسال ترددات متوسطة.حيث تنتج IC1a و ال sensor تردد 1Mhz ويتم تعديل هذا التردد بالتردد الصوتي الناتج من IC1b . فعندما تقترب يد او قدم من ال sensor فان تردد IC1a يقل بصورة ملحوظة وبضبط راديو الاستقبال على تردد اقل من 1Mhz فسوف تسمع الصفرة عند اقتراب أي شخص من ال sensor .

This simple circuit is sure to have the police beating a path to your door - however, it has the added advantage of alerting you to their presence even before their footsteps fall on the doormat.



The circuit transmits on Medium Wave (this is the small problem with the police). IC1a, together with a sensor (try a 20cm x 20cm sheet of tin foil) oscillates at just over 1MHz. This is modulated by an audio frequency (a continuous beep) produced by IC1b. When a hand or a foot approaches the sensor, the frequency of the transmitter (IC1a) drops appreciably.

Suppose now that the circuit transmits at 1MHz. Suppose also that your radio is tuned to a frequency just below this. The 1MHz transmission will therefore not be heard by the radio. But bring a hand or a foot near to the sensor, and the transmitter's frequency will drop, and a beep will be heard from the radio.

Attach the antenna to a multi plug adapter that is plugged into the mains, and you will find that the Medium Wave transmission radiates from every wire in your house. Now place a suitably tuned Medium Wave radio near some wires or a plug point in your house, and an early-warning system is set up.

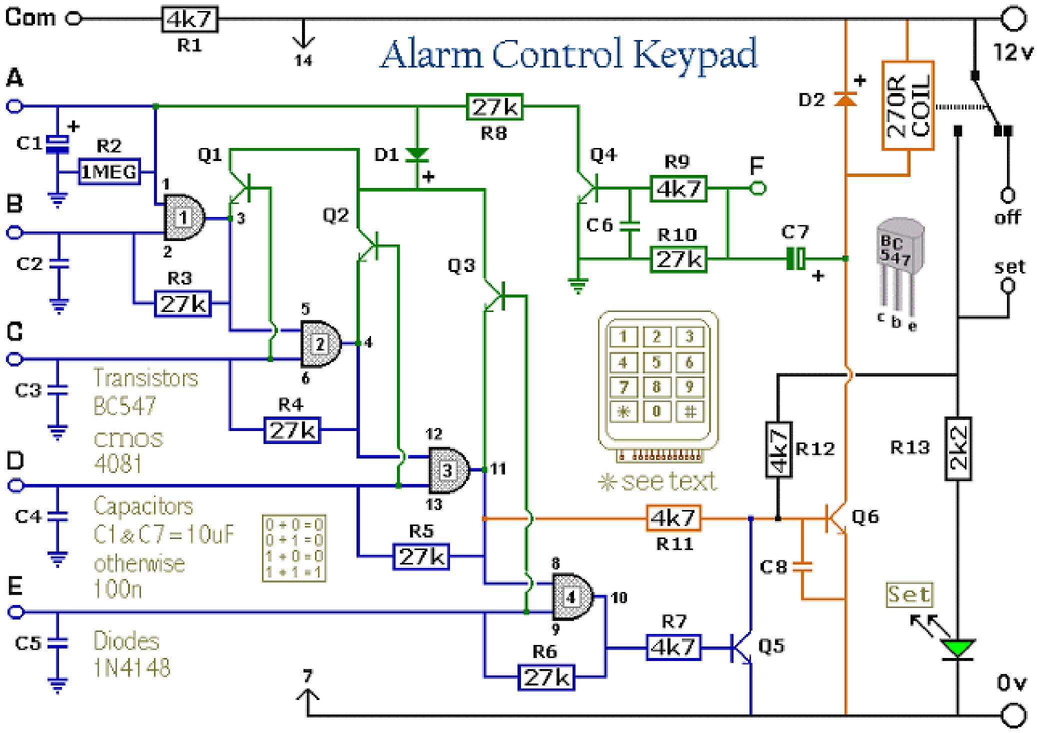
Instead of using the sheet of tin foil as the sensor, you could use a doorknob, or burglar bars. Or you could use a pushbutton and series resistor (wired in series with the 33K resistor - the pushbutton would short it out) to decrease the frequency of IC1a, so activating the system by means of a pushbutton switch. In this case, the radio would be tuned to a frequency just below that of the transmitter.

22- Enhanced 5 Digit Alarm Keypad لوحة مفاتيح تستخدم مع نظام الإنذار(شفرة خماسية)

تستخدم لوحة لمفاتيح هذه مع نظام الإنذار السابق وهي مكونة من أثنى عشر مفتاح وتقوم بفتح البوابة بشفرة مكونة من خمسة أرقام . قم باختيار خمسة أرقام تريد أن تجعلهم شفرة لك لفتح نظام الإنذار وقم بتوصيلهم على الدائرة بالمفاتيح A,B,C,D & E والجميع يوصل بالمقاومة R1 . وقم بتوصيل باقي المفاتيح بالطرف F . و نقوم بضبط جهاز الإنذار باستخدام المفاتيح الأربعة الأولى من الخمسة المختارين ويضغط عليهم بالترتيب الصحيح في خلال فترة زمنية تحدد بقمة المكثف C1 والمقاومة R11 (عشرة ثواني تقريبا). التيار في المقاومة R11 يقوم بتشغيل الترانزيستور Q6 والذي يقوم بتنشيط ال relay والذي يقوم بإمداد قاعدة الترانزيستور Q6 بالتيار من خلال المقاومة R12 ويقوم بتشغيل ال SET LED . و لإعادة غلق الدائرة نقوم بالضغط على مفاتيح الشفرة بالترتيب الصحيح .

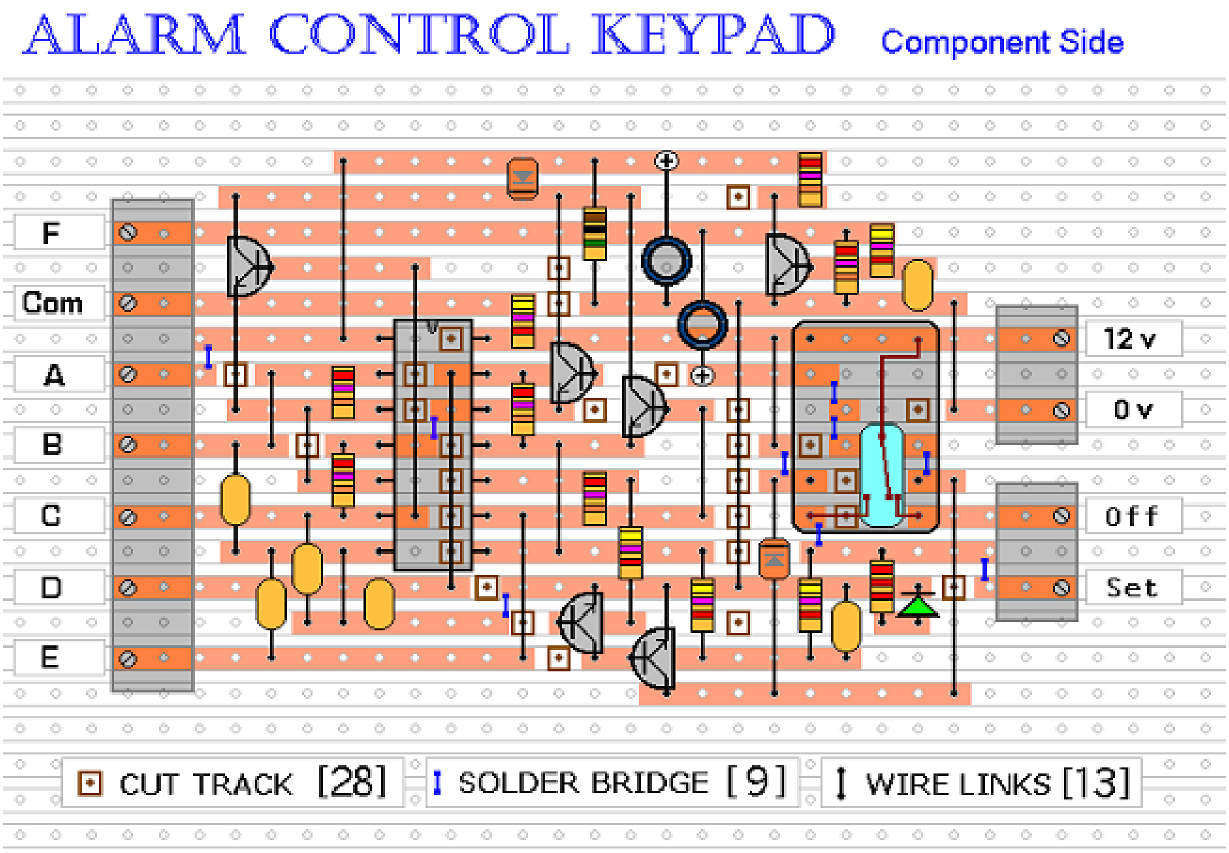
Description:

This is an enhanced 5 digit keypad which may be used with the Modular Alarm



Notes:

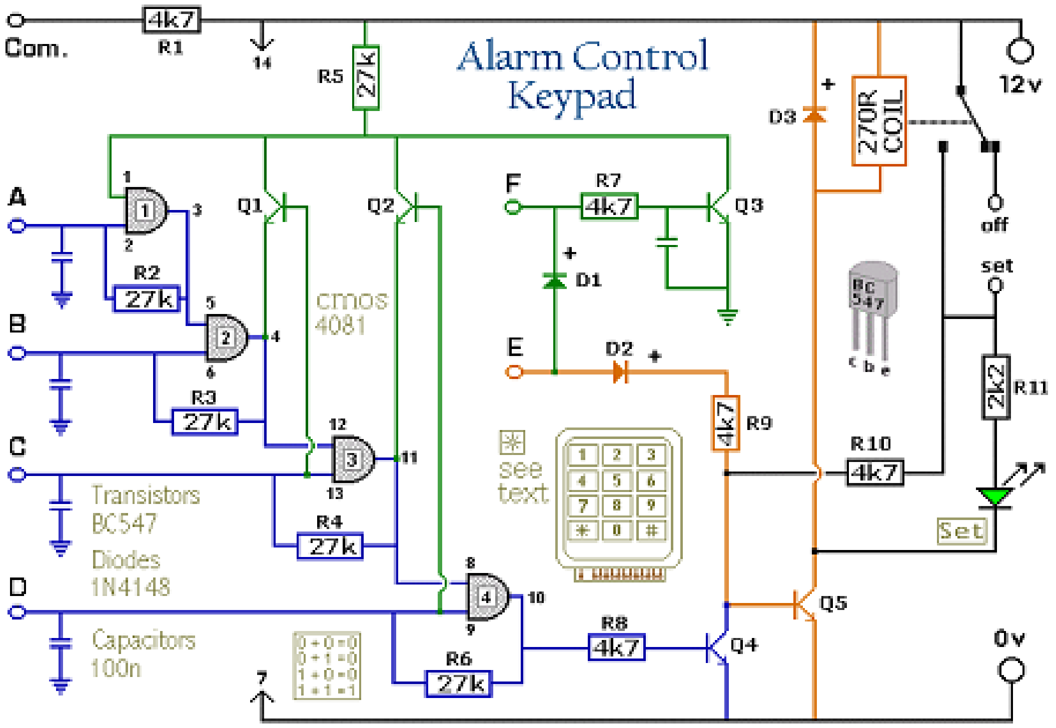
This switch will suit the Modular Burglar Alarm circuit. However, it also has other applications. The Keypad must be the kind with a common terminal and a separate connection for each key. On a 12-key pad, look for 13 terminals. The matrix type with 7 terminals will NOT do. Choose the five keys you want as your code, and connect them to 'A, B, C, D & E'. Wire the common to R1 and all the remaining keys to 'F'. Because your choice can include the non-numeric symbols, almost 100 000 different codes are available. The Alarm is set using the first four of your five chosen keys. When 'A, B, C & D' are pressed in the right order and within the time set by C1 and R2 (about 10 seconds), current through R11 switches Q6 on. The relay To switch the Alarm off again it is necessary to press A, B, C, D & E in the right order. The IC is a quad 2-input AND gate, a Cmos 4081. These gates only produce a high output when both inputs are high. Pressing 'A' takes pin 1 high for a period of time set by C1 and R2. This 'enables' gate 1, so that when 'B' is pressed, the output at pin 3 will go high. This output does two jobs. It locks itself high using R3 and it enables gate 2 by taking pin 5 high. The remaining gates operate in the same way, each locking itself on through a resistor and enabling its successor. If the correct code is entered within the time allowed, pin 10 will switch Q5 on and so connect the base of Q6 to ground. This causes Q6 to switch off and the relay energizes, and then holds itself on by providing base current for Q6 through R12. The 12-volt output switches from the "off " to the "set " terminal, and the LED lights. to drop out. Any keys not wired to 'A, B, C, D or E ' are connected to the base of Q4 by R9. Whenever one of these 'wrong' keys is pressed, Q4 takes pin 1 low. This removes the 'enable' from gate 1, and the code entry process fails. If C, D or E is pressed out of sequence, Q1, Q2 or Q3 will also take pin 1 low, with the same result. You can change the code by altering the keypad connections. If you make a mistake entering the code, just start again. If you need a more secure code you can use a bigger keypad with more 'wrong' keys wired to 'F'. A 16-key pad gives over half a million different codes. All components are shown lying flat on the board; but some are actually mounted upright. The links are bare copper wires on the component side. Two of the links must be fitted before the IC.



23 - Enhanced 4 Digit Alarm Keypad لوحة مفاتيح تستخدم مع نظام الإنذار

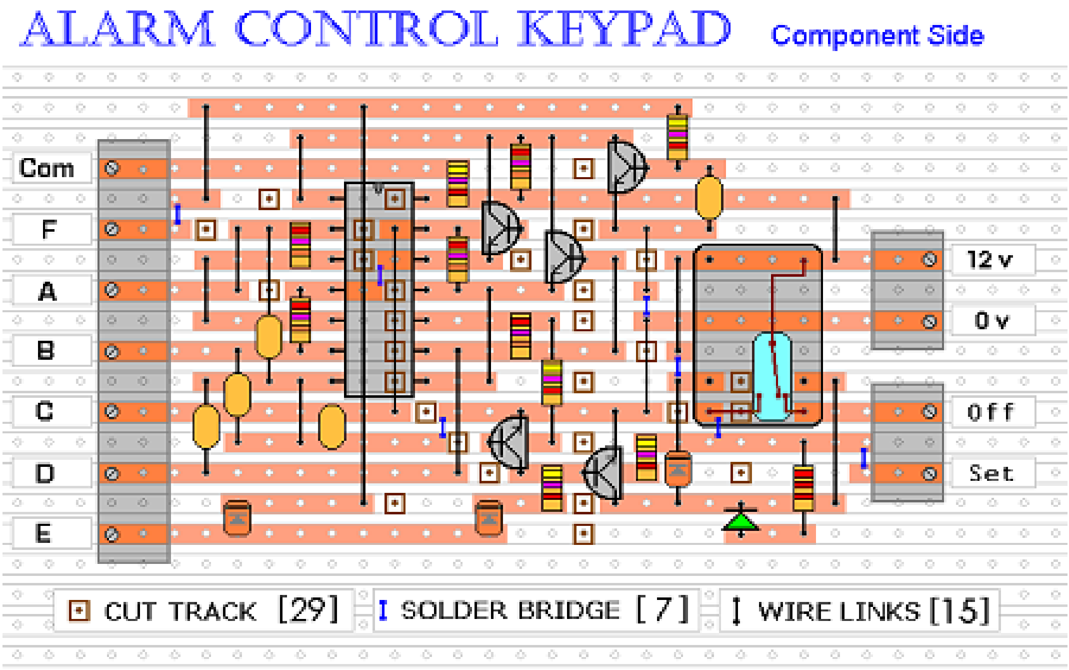
تستخدم لوحة لمفاتيح هذه مع نظام الإنذار السابق وهي مكونة من أثنى عشر مفتاح وتقوم بفتح البوابة بشفرة مكونة من أربعة أرقام . نفس فكرة عمل دائرة لوحة المفاتيح السابقة .

Description:
This is an enhanced 5 digit keypad which may be used with the



Notes:
The Keypad must be the kind with a common terminal and a separate connection for each key. On a 12-key pad, look for 13 terminals. The matrix type with 7 terminals will NOT do. The Alarm is set by pressing a single key. Choose the key you want to use and wire it to 'E'. Choose the four keys you want to use to switch the alarm off, and connect them to 'A B C & D'. Your code can include the non-numeric symbols. With a 12-key pad, over 10 000 different codes are available. Wire the common to R1 and all the remaining keys to 'F'. When 'E' is pressed, current through D2 and R9 switches Q5 on. The relay energizes, and then holds itself on by providing base current for Q5 through R10. The 12-volt output is switched from the "off " to the "set " terminal, and the LED lights. To switch the Alarm off again it is necessary to press A, B, C & D in the right order. The IC is a quad 2-input AND gate, a CMOS 4081. These gates only produce a high output when both inputs are high. Pin 1 is held high by R5. This 'enables' gate 1, so that when 'A' is pressed, the output at pin 3 will go high. This output does two jobs. It locks itself high using R2 and it enables gate 2 by taking pin 5 high. The remaining gates operate in the same way, each locking itself on through a resistor and enabling its successor. If the correct code is entered, pin 10 will switch Q4 on and so connect the base of Q5 to ground. This causes Q5 to switch off and the relay to drop out. Any keys not wired to 'A B C D or E' are connected to the base of Q3 by R7. Whenever one of these 'wrong' keys is pressed, Q3 takes pin 1 low. This removes the 'enable' from gate 1, and the code entry process fails. If 'C' or 'D' is pressed out of sequence, Q1 or Q2 will also take pin 1 low, with the same result. You can change the code by altering the keypad connections. If you need a more secure code use a bigger keypad with more 'wrong' keys wired to 'F'. A 16-key pad gives over 40 000 different codes. All components are shown lying flat on the board; but some are actually mounted upright. The links are bare copper wires on the component side. Two of the links must be fitted before the IC.

Vero board Layout

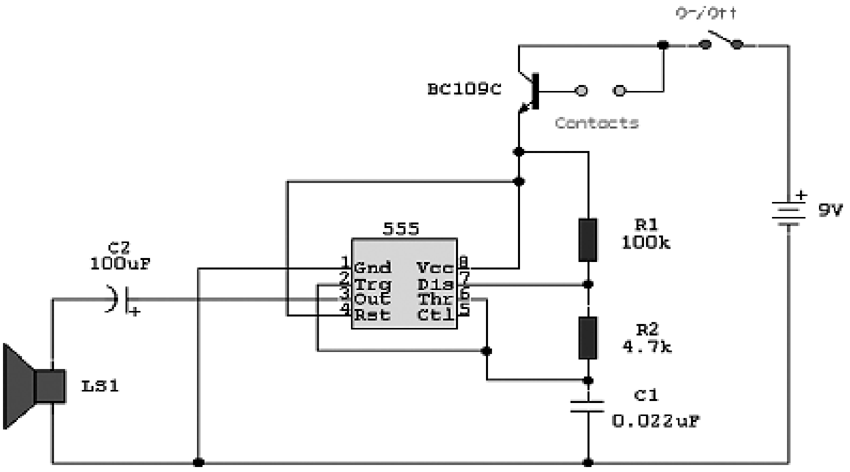


24- Water Activated Alarm دائرة إنذار ضد الماء

تستخدم الدائرة المتكاملة ٥٥٥ كمذبذب يتم تغذيتها من مشع الترانزيستور BC109C . في حالة عدم وجود الماء سوف يكون أن الترانزيستور في حالة الانحياز الخلفي ولن تعمل الدائرة أما في حالة وجود الماء يكون الترانزيستور في حالة التوصيل الأمامي ويقوم بتغذية ال٥٥٥ التي تجعل صوت الإنذار يعمل .

The circuit uses a 555 timer wired as an astable oscillator and powered by the emitter current of the BC109C. Under dry conditions, the transistor will have no bias current and be fully off. However as the probes get wet the transistor will conduct and sounding the alarm.

An On/Off switch is provided and remember to use a non-reactive metal for the probe contacts. Gold or silver plated contacts from an old relay may be used, however a cheap alternative is to wire alternate copper strips from a piece of veroboard. These will eventually oxidize over but as very little current is flowing in the base circuit, the higher impedance caused by oxidization is not important. No base resistor is necessary as the transistor is in emitter follower, current limit being the impedance at the emitter (the oscillator circuit).



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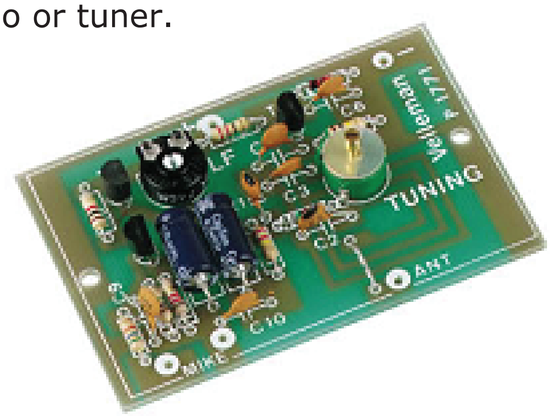
Audio Circuits

1- FM OSCILLATOR

مذبذب تنغيم ترددي

تعمل الدائرة علي الترددات الواقعة بين (١٠٠ – ١٠٨ ميجا هرتز)، وتناسب ايضا استخدام اي نوع من انواع الميكروفونات. كما يمكن استقبال الاشارة الناتجة من الدائرة باستخدام جهاز الراديو العادي. جهد التشغيل من ٩-١٢ فولت.

Mini FM modulator (100-108MHz).
Integrated pre-amplifier, to which any type of microphone may be connected.
Family broadcasts, baby phone, security.
May be received by any portable FM radio or tuner.



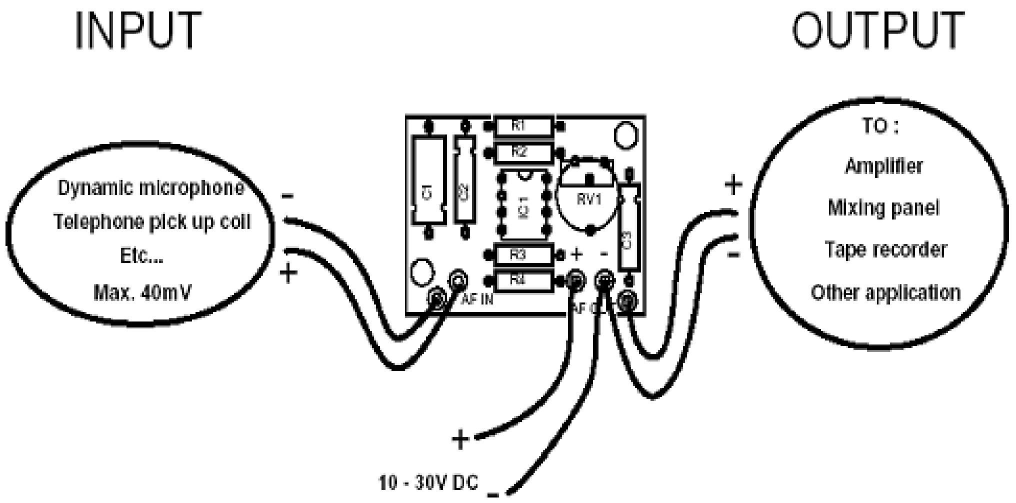
Specifications :

1. High quality varicap modulation
2. Ultra stable FET oscillator
3. Tunable from 100 to 108 MHz
4. FET input amplifier with high sensitivity (10mV max.)
5. Easy microphone hook-up
6. No coils to wind
7. Receive with any FM radio
8. Miniature size, yet very sensitive
9. Power supply : 9-12VDC (Use battery for best results)
10. Dimensions : 45 x 70 mm (1.8” x 2.7” inch)

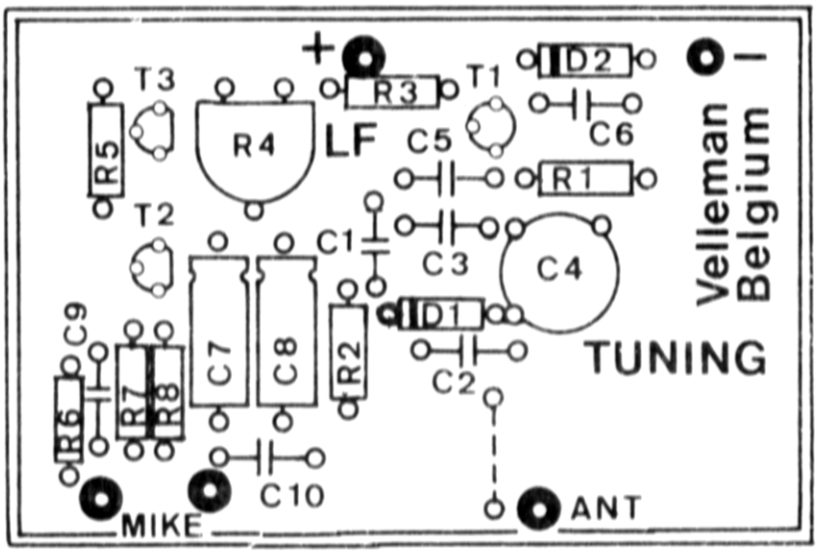
Applications :

1. Use as test oscillator for FM tuners
2. For family broadcasts
3. As part of a wireless microphone
4. For security applications
5. Nice gadget
6. Your own unique application

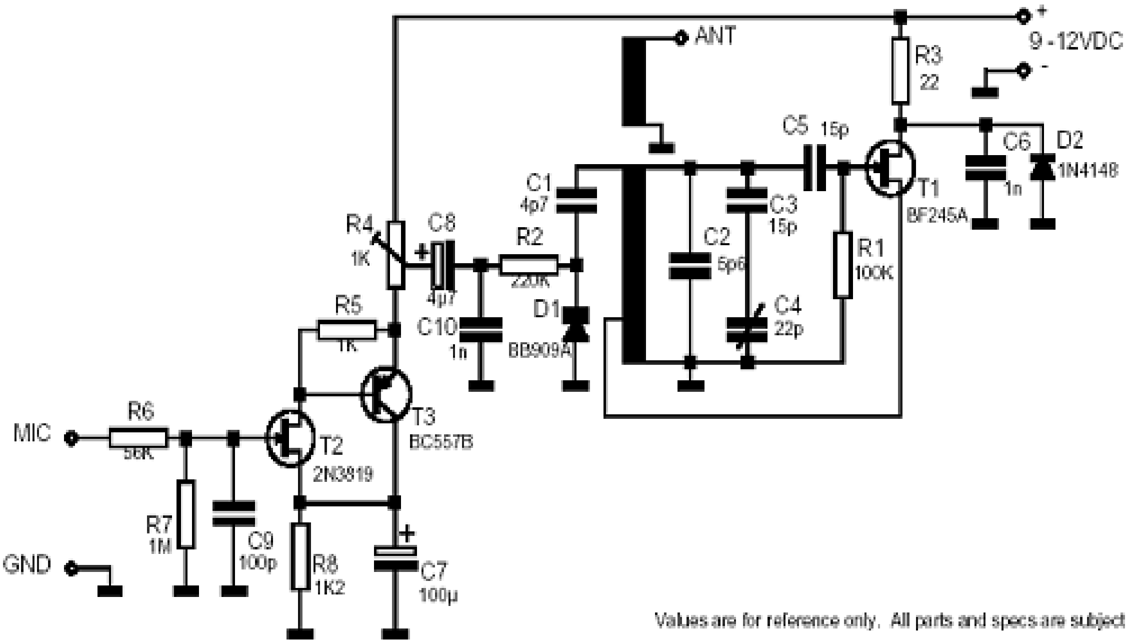
Connection Example



PCB Top-View



Circuit Diagram

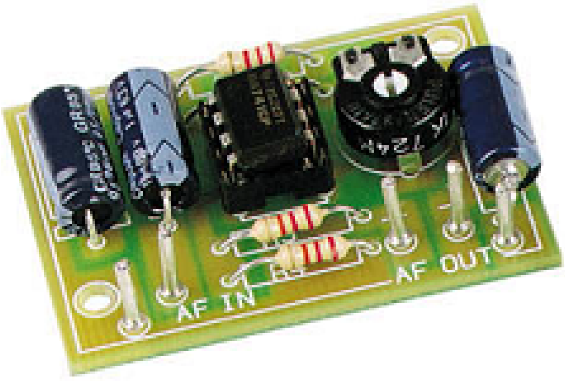


Values are for reference only. All parts and specs are subject to changes

2- UNIVERSAL MONO PRE-AMPLIFIER مكبر ابتدائي للإشارة الصوت الأحادية

تستخدم هذه الدائرة لتكبير الاشارة الصوتية قبل دخولها لمكبر القدرة. جهد التشغيل من ١٠-٣٠ فولت.

This kit has been developed as pre-module for a number of audio applications where there is insufficient input signal. Applications as a microphone pre-amplifier or for level correction.



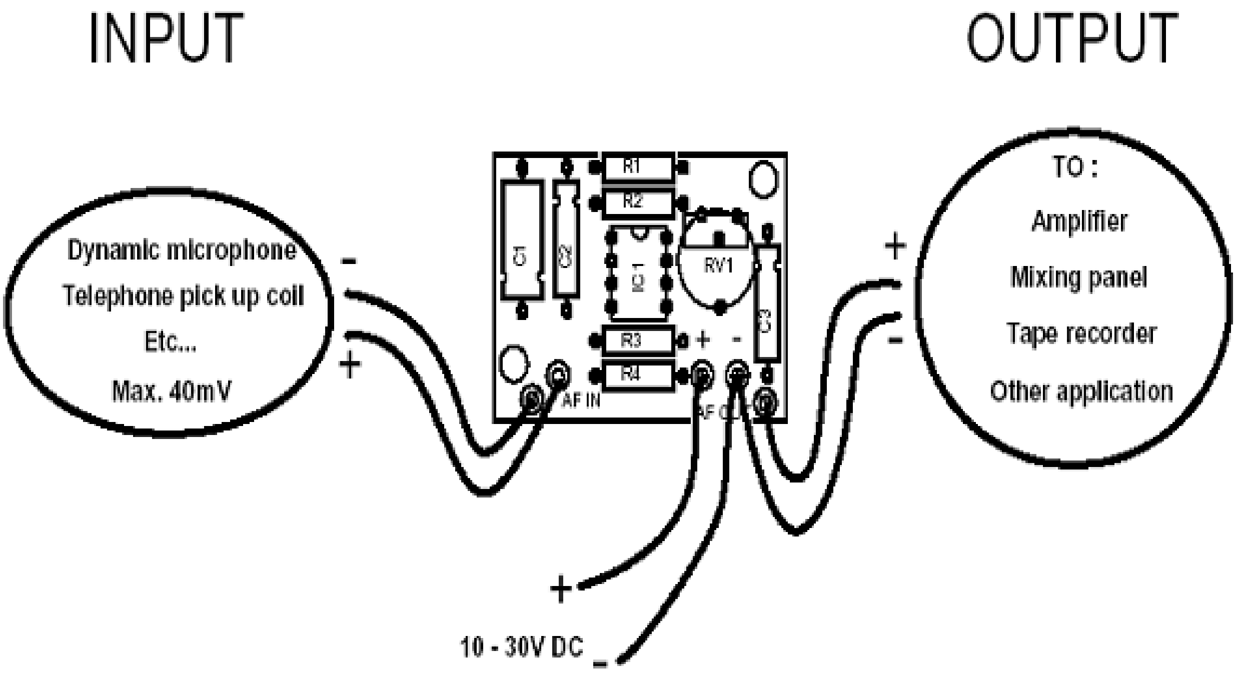
Specifications :

1. Single supply : 10 to 30V
2. Gain : 40dB (adjustable)
3. Freq. response : 20Hz to 20kHz (-3dB)
4. Max. input level : 40 mV
5. Output impedance : 1K ohm
6. Supply current : 10mA at 12V (typical)
7. Dimensions : 30x44mm (1.2” x 1.7”)

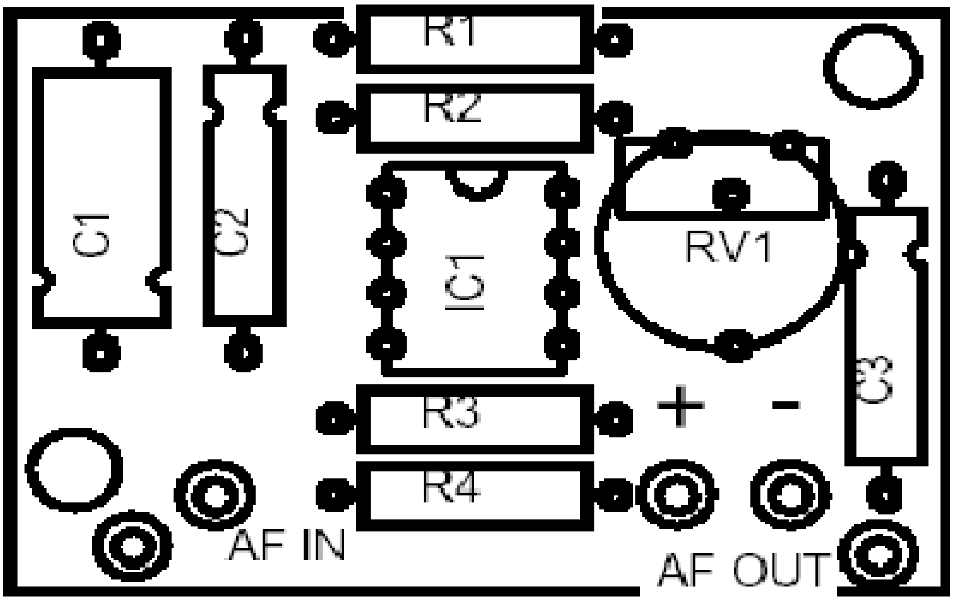
Applications :

1. Boost any small audio signal up to 100 times
2. Microphone pre-amp
3. Telephone pick-up amplifier
4. Your own unique application

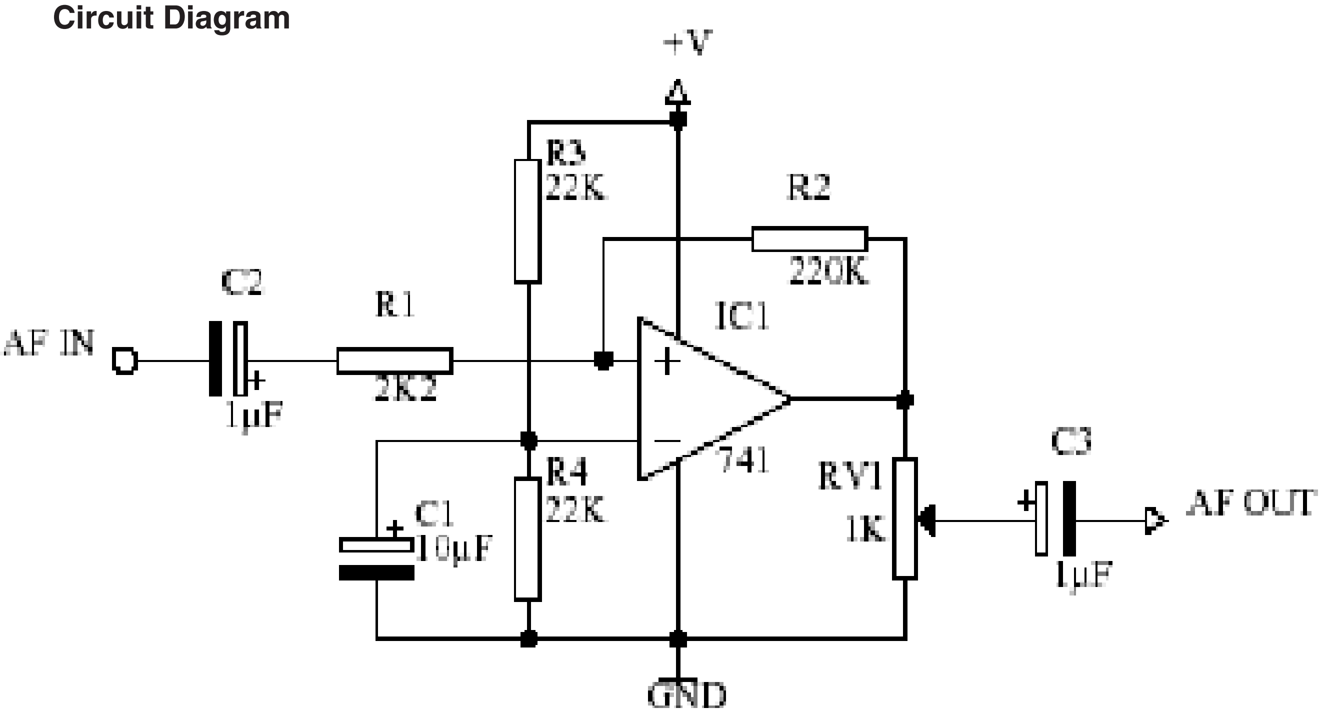
Connection Example



PCB Top-View



Circuit Diagram

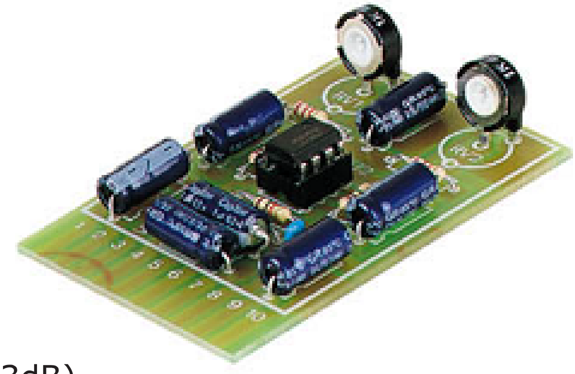


3- UNIVERSAL MONO PRE-AMPLIFIER

مكبر ابتدائي للاشارة الصوتية الاحادية

تستخدم هذه الدائرة لتكبير الاشارة الصوتية قبل دخولها لمكبر القدرة. جهد التشغيل من ١٠-٣٠ فولت. الحيز الترددي ٤٠ هرتز – ٣٠ ك هرتز.

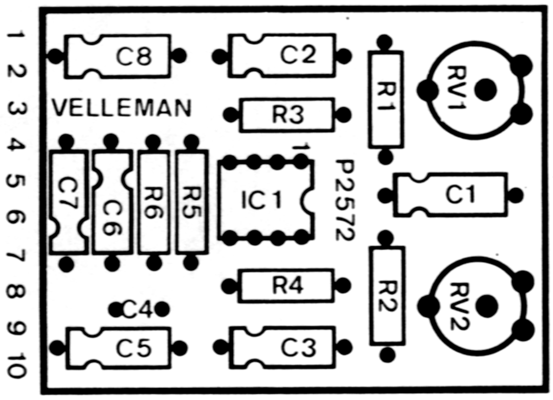
A low-noise integrated circuit was added and the preamplifier was made in the stereo mode. There is also an RIAA correction amplifier which is completely compatible bearing the reference.



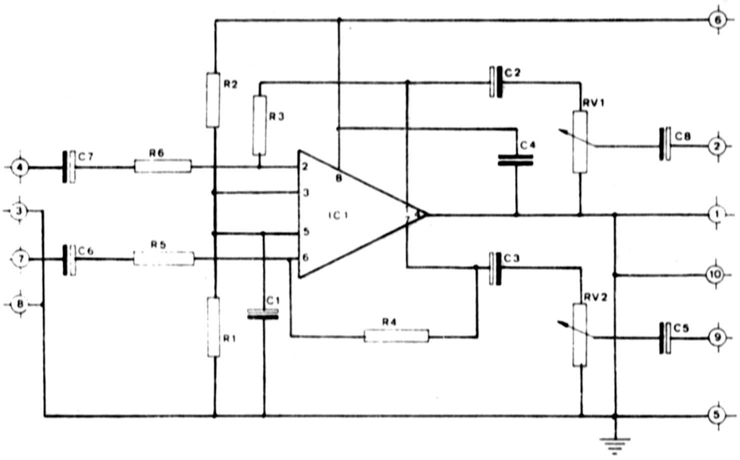
Specifications

1. Frequency range : 40Hz - 30kHz (-3dB)
2. Max. input voltage : 50mVrms
3. Adjustable gain : 40dB max.
4. Output impedance : 1Kohm
5. Power supply : 10-30VDC / 5mA
6. PCB dimensions : 44 x 65mm (1.7" x 2.6")

PCB Top-View



Circuit Diagram:



4- STEREO RIAA PRE-AMPLIFIER

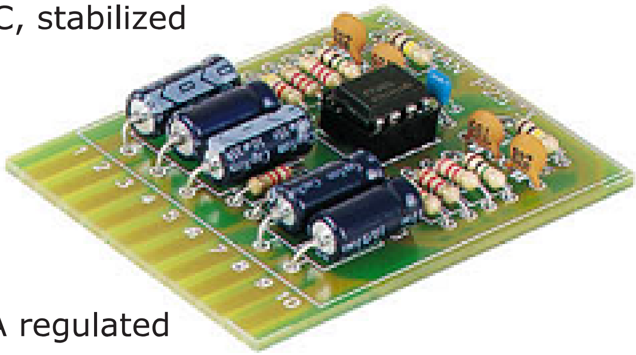
مكبر ابتدائي للاشارة الصوتية (ثنائية)

تستخدم هذه الدائرة لتكبير الاشارة الصوتية قبل دخولها لمكبر القدرة. جهد التشغيل من ١٠-٣٠ فولت، التيار المستخدم ٥ ميلي امبير.

In addition to the universal preamp, this kit is used
As an RIAA stereo preamp, completely compatible with the
first named. Us duty is to bring the signals of a magnetic cell to a level
for a next amplification.

Technical data :

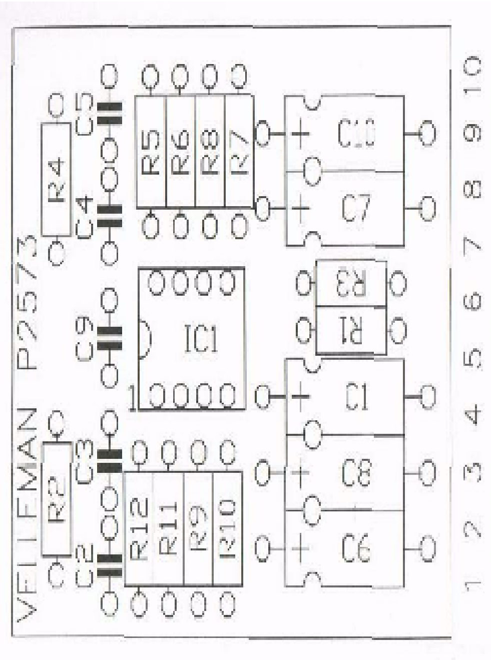
1. Power supply : 10 through 30 V DC, stabilized
2. Supply current : type. 5mA
3. Amplification (1 KHz): 35 dB
4. Input impedance : 47 K
5. IAA curve
6. Input signal : 5 to 10 mV



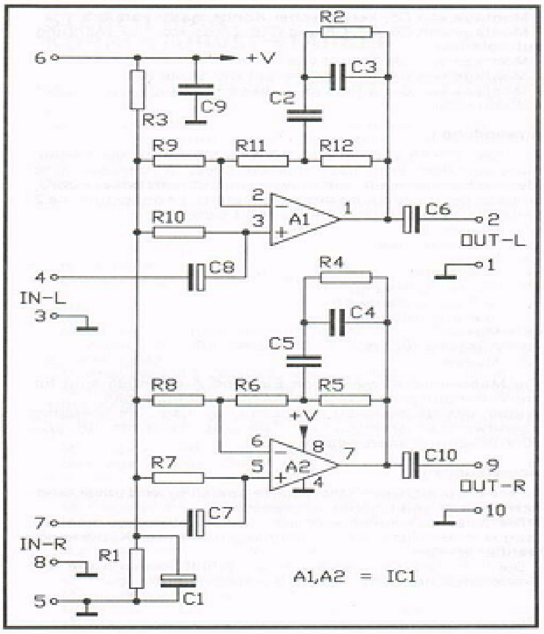
Specifications:

1. Supply Voltage : 10 -30VDC / 5mA regulated
2. Gain (1KHz) : 35dB
3. Input Signal : 5 - 10mV
4. Input Impedance : 47Kohm
5. PCB Dimensions : 44 x 65mm (1.7" x 2.6")

PCB Top-View



Circuit Diagram

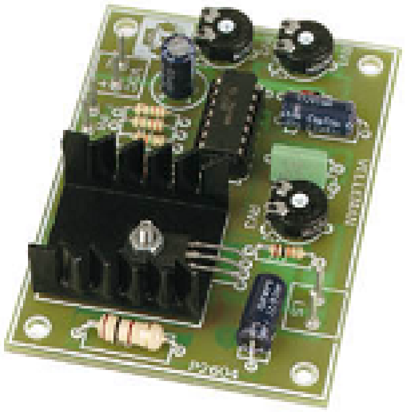


5- POLICE SIREN

سرينة الشرطة

ان هدف الدائرة هو تكملة سلسلة الدوئر المتعلقة بتوليد صوت سرينة الشرطة. يمكن بواسطة المقاومات المتغيرة الثلاث ان تنوع من الصوت الناتج، هذه الدائرة تم تصميمها لتصبح سرينة كوجاك. جهد التشغيل من ٨-١٢ فولت.

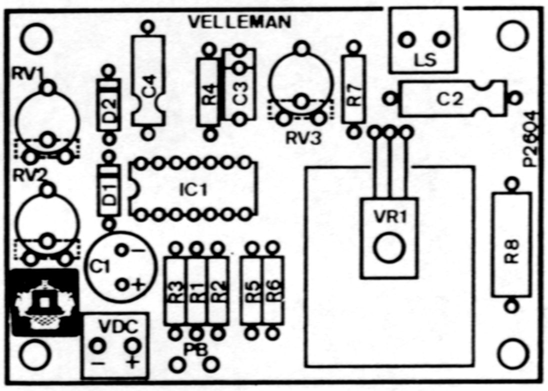
The aim of this kit is to complete the whole series of the exasperating electronic noise makers in a cheap and simple way.
You may imitate any police siren by using the three adjustable potentiometers. Specifically, this kit can be used as a "Kojak siren". Even with a low power loudspeaker (4-160hm/ 0.5W) it will be possible to make a fantastic noise.



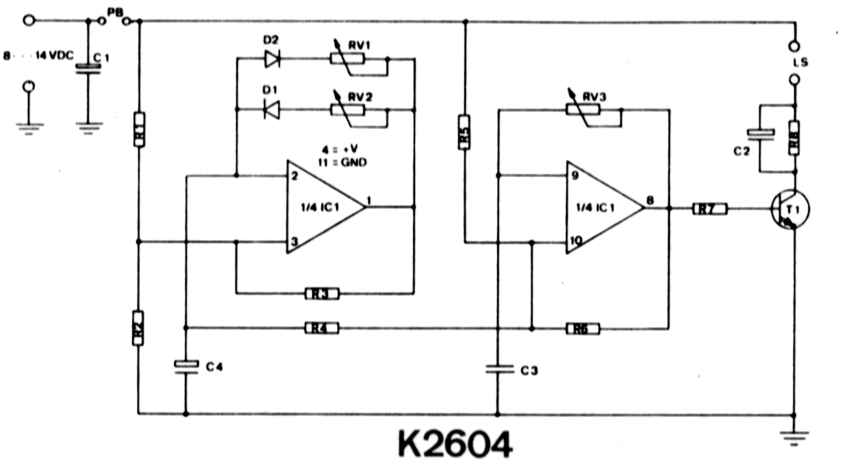
Specifications

1. power supply : 8 - 14VDC / 1A
2. loudspeaker included
3. dimensions : 79 x 57mm (3.1" x 2.2")

PCB Top-View:



Circuit Diagram:

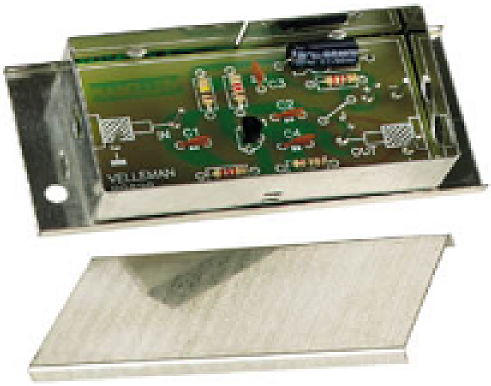


K2604

6- POLICE SIREN

سرينة الشرطة

تعد هذه الدائرة واحدة من سلسلة الدوائر المولدة لصوت سرينة الشرطة. تنفرد الدائرة بالتصميم الفريد، الغطاء المعدني الذي يمكنها من الاستخدام في اماكن عديدة. كما يمكن استخدامها ايضا في السيارات عن طريق تغذيتها بالجهد من بطارية السيارة. جهد التشغيل من ١٢-١٥ فولت.

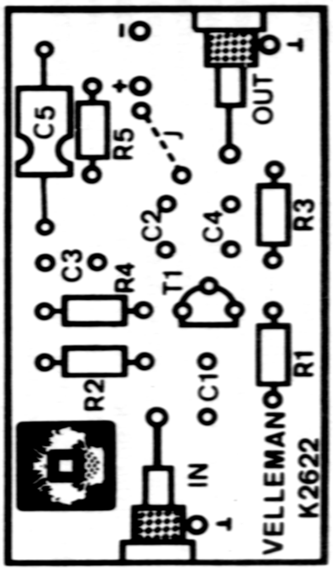


Although radios and tuners are getting more and more sensitive now, there are still a lot of places where an extra amplification of the antenna is welcome : just think about the car radio, the hifi installation in the city . Where one often cannot install a good antenna. This kit is a possible and inexpensive answer to this problem. The construction is very simple and the metal housing makes the installation easy and uncritical. The power supply can either be derived from a car accumulator or a 12 VDC power supply (via the antenna cable or not).

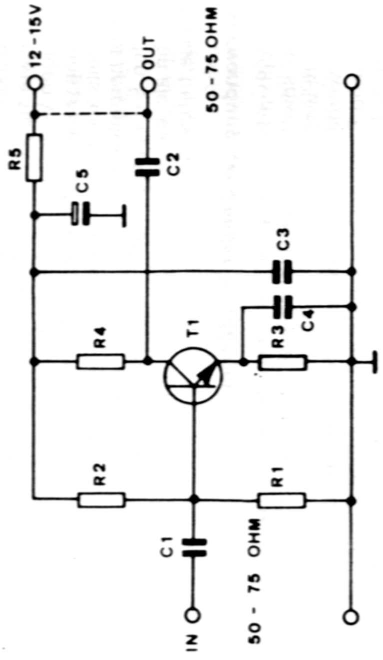
Specifications

1. gain : 22dB
2. power supply : 12V to 15V / 3mA
3. input- and output impedance : 50 - 75ohm
4. frequency range : 10MHz to 150MHz
5. dimensions : 86 x 36 x 24mm (3.4" x 1.4" x 0.9")

PCB Top-View



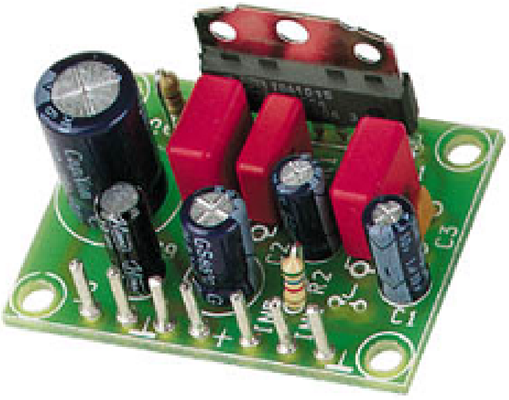
Circuit Diagram:



7- 2.5 WATT AUDIO AMPLIFIER مكبر صوت قدرته ٢,٥ وات

بالرغم من صغر حجم الدائرة فان يمكن استخدامها كمكبر للصوت او كمكبر ابتدائي، كما انها لا تحتاج لاي نوع من انواع الضبط. جهد التشغيل من ٤,٥-١٥ فولت، التيار المستخدم ٤٠٠ ميللي امبير. قدرة الخرج ٢,٥ وات.

Small PCB for both pre-amplifier and power amplifier,
which may be used separately. No adjustments required.
Short circuit protection.



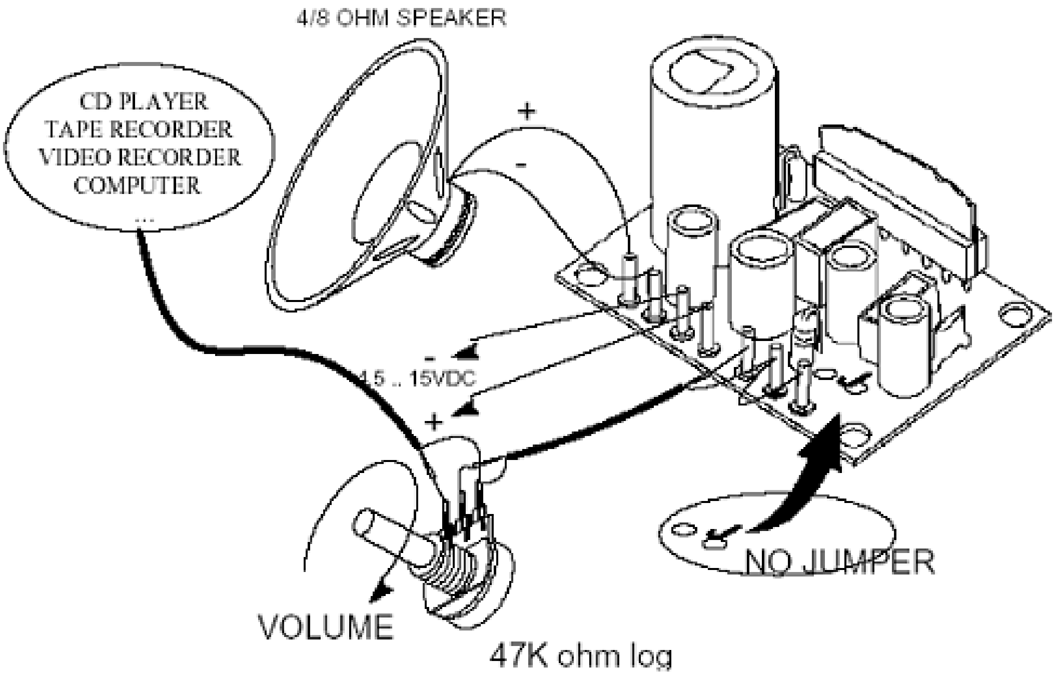
Specifications :

1. Max. output power : 2.5W (4W /12V)
2. Frequency response : 60Hz - 15KHz
3. Input sensitivity : 20-150mV selectable
4. Thermal and short circuit protection
5. Power supply : 4.5 - 15VDC /400mA
6. Quiescent current : 12mA
7. Dimensions : 42x32mm (1.65”x1.25”)

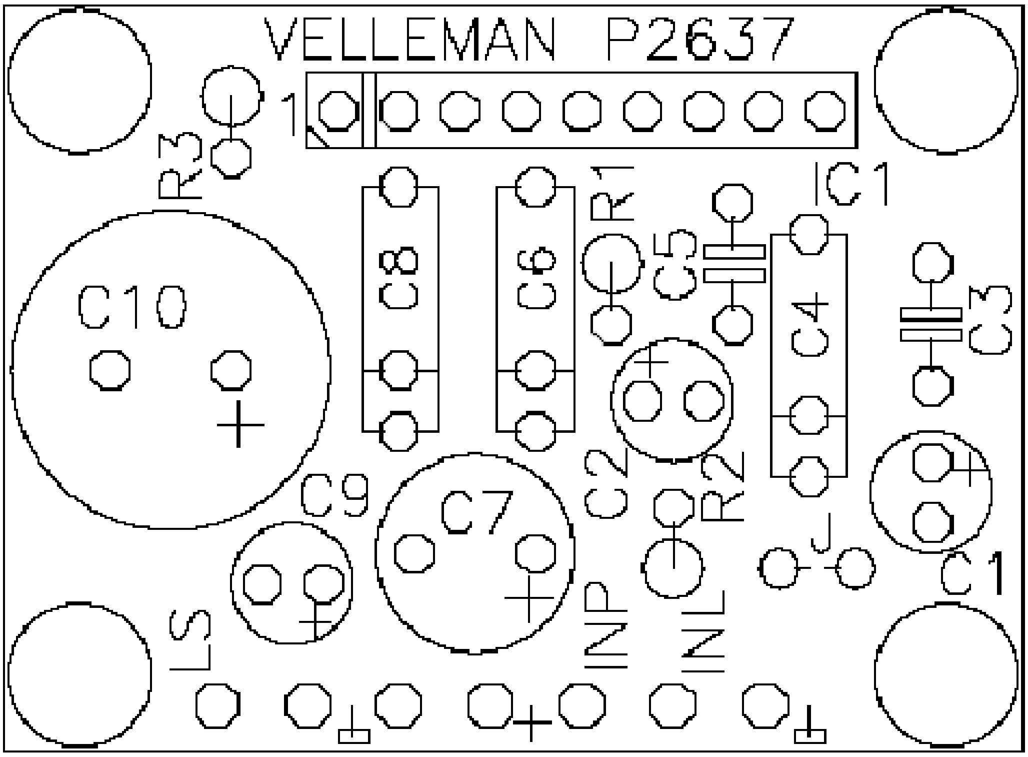
Applications :

1. Small but powerful multi-purpose amplifier
2. For use with portable audio equipment
3. Power amplifier for audio projects
4. In-car use
5. Your own unique application

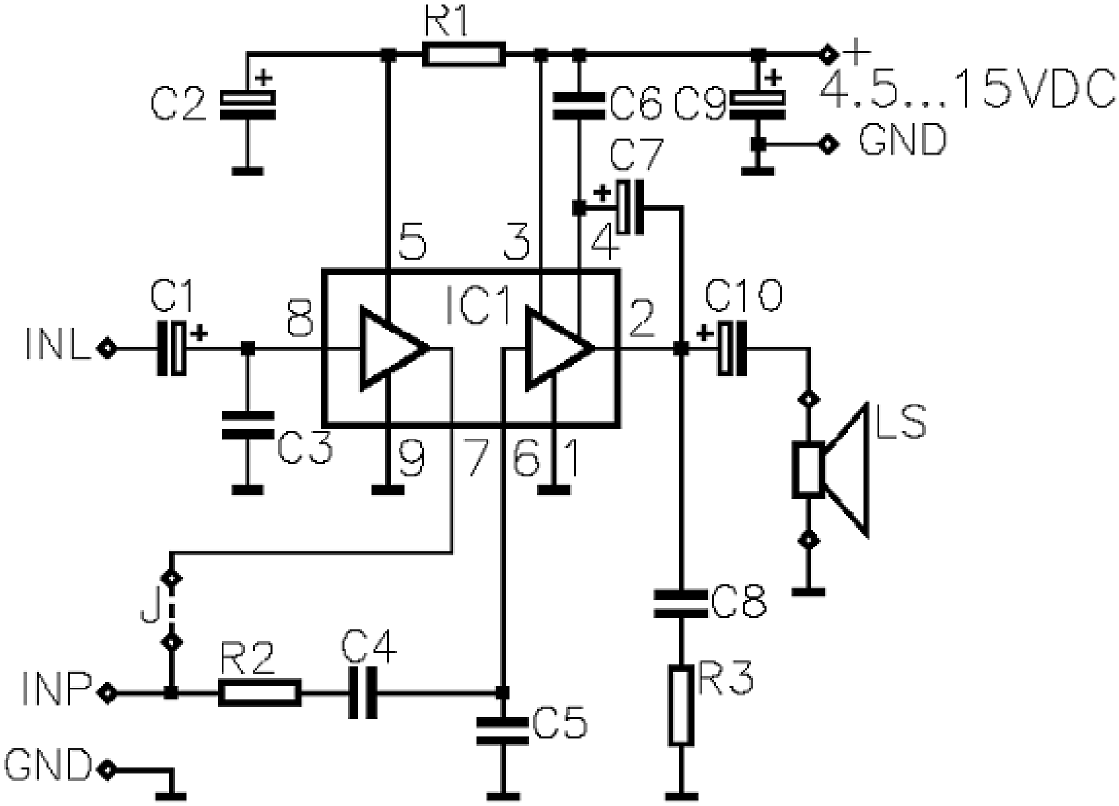
CONNECTION EXAMPLE HIGH LEVEL INPUT



PCB Top-View



Circuit Diagram:



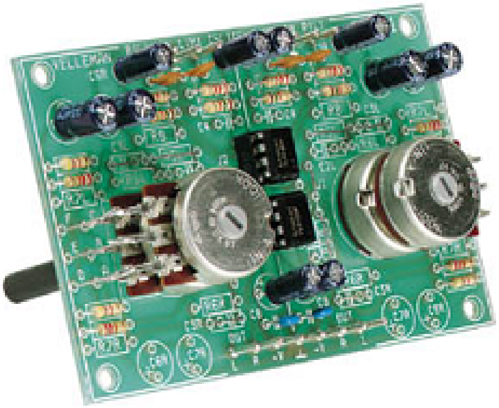
8- DUAL INPUT AMPLIFIER MODULE

دائرة تكبير ثنائية الدخل

تستخدم الدائرة في دوائر مزج الصوت او لوحات مزج الاصوات، فالدائرة لها دخلين منفصلين ويمكن التحكم في قدرة كل دخل منفصلا . جهد التشغيل من ١٥-١٨ فولت.

FOR AUDIO MIXING PANELS

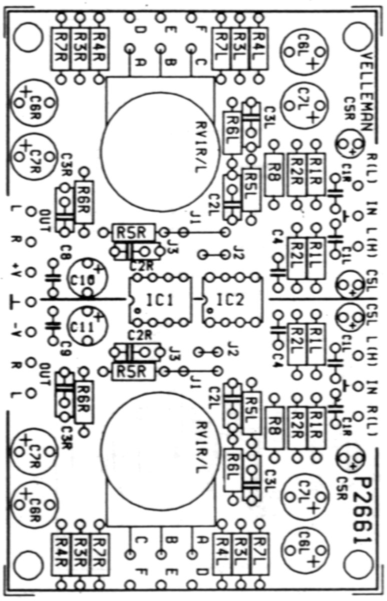
This module comprises two stereo input amplifiers with gain control. Each amplifier can be built up in four different ways: as a microphone input (MIC symmetrical or asymmetrical), as a mono line input (LINE symmetrical or asymmetrical), as a stereo line input (LINE or AUX), or as a record player input with RIAA correction (PHONO). With every version, amplification can be adjusted within a range of about 25dB.



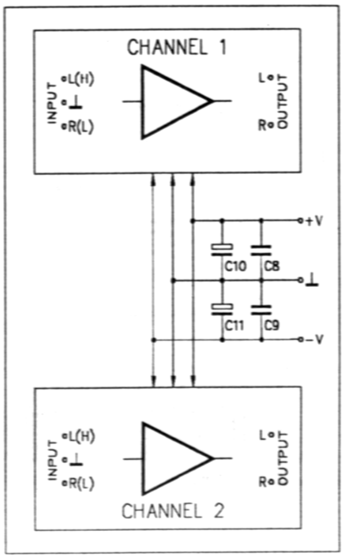
Specifications :

1. two stereo channels
2. gain adjustment : 25dB
3. signal to noise ratio : > 80dB
4. total harmonic distortion : < 0.05%
5. frequency response : 20Hz to 20KHz (0.5dB)
6. RIAA correction : > 1dB
7. supply voltage : + and - 15/18V (regulated)
8. PCB dimensions : 63 x 98mm (2.5" x 3.9")

PCB Top-View



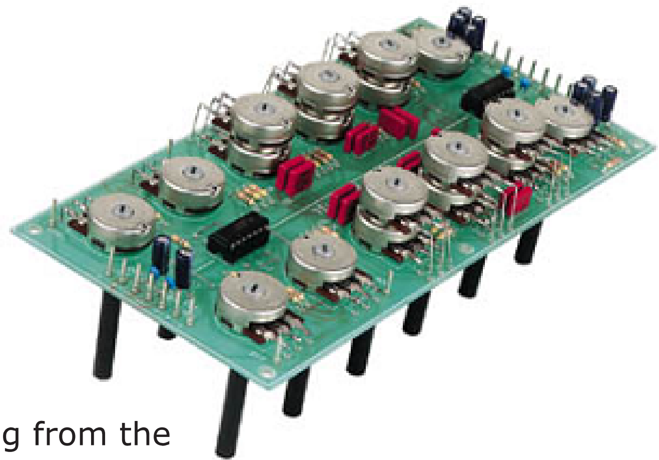
Circuit Diagram



9- DUAL TONE CONTROL MODULE FOR AUDIO MIXER
كارت تحكم ثنائي النغمة لمازج الصوت

يتكون الكارت من دخلين استريو منفصلين علي لوحة مطبوعة واحدة، ويتحكم الكارت في التوازن بين القناتين، كما يمكن التحكم في مستوي الصوت.

Two stereo channels on a single PCB. Independent control of :



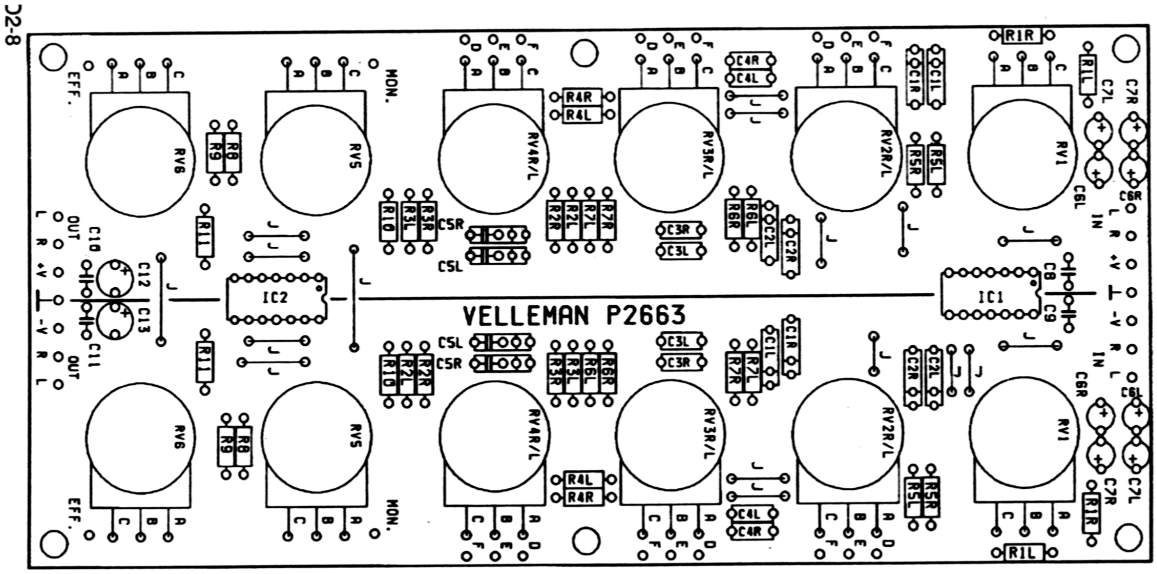
* Balance and panning
* Bass, medium or treble tone
* Monitor level
* Effects level.

The monitor and effects signals coming from the different tone control modules respectively are converted by the monitor and effects module, to a mono monitor output (for stage) and a mono effects output (for echo chamber etc.).

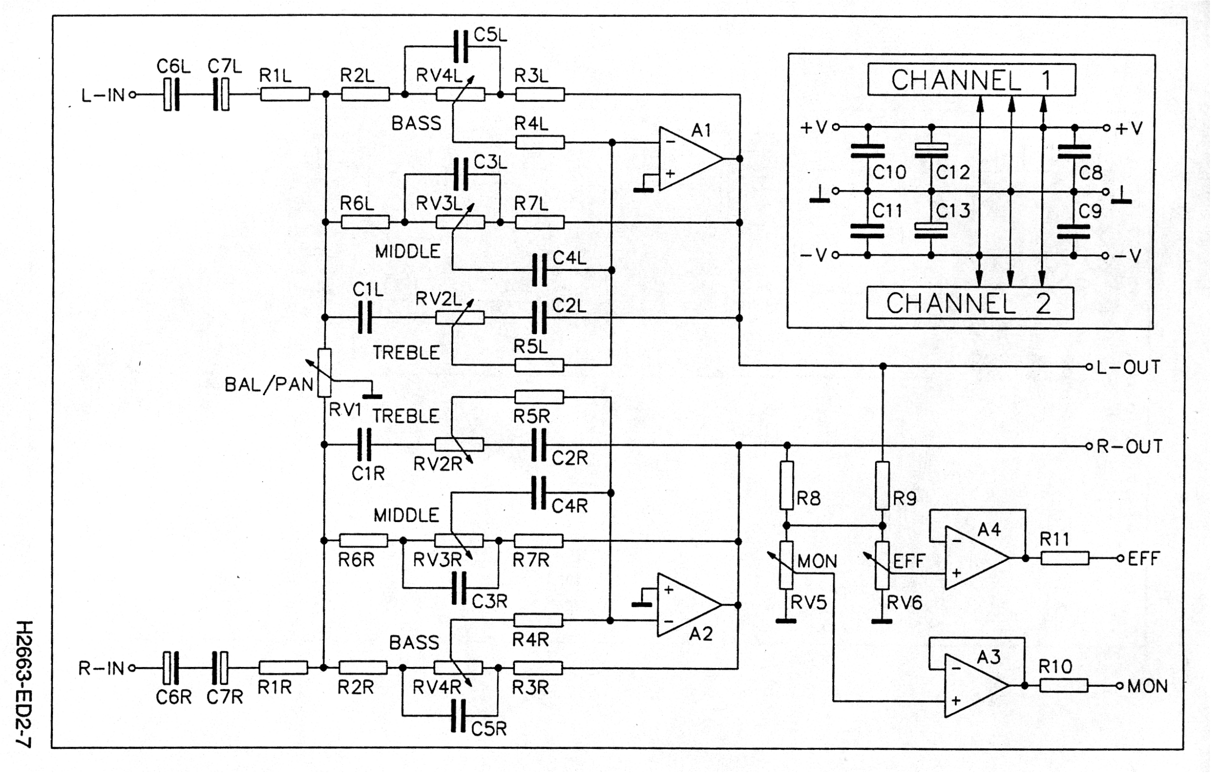
Specifications

1. two stereo channels
2. 3 tone controls : 50Hz, 1KHz, 15KHz (+ and -12dB)
3. signal to noise ratio : > 92dB
4. PCB dimensions : 203 x 98mm (8.0" x 3.9")

PCB Top-View


VELLEMAN P2663
D2-8
IC1
IC2
RV1
RV2R/L
RV3R/L
RV4R/L
RV5
RV6
EFF.
MON.
OUT
IN
L R +V ⊥ -V R L
C1R C1L C2R C2L C3R C3L C4R C4L C5R C5L C6R C6L C7R C7L C8 C9 C10 C11 C12 C13
R1R R1L R2R R2L R3R R3L R4R R4L R5R R5L R6R R6L R7R R7L R8 R9 R10 R11
A B C D E F
J

Circuit Diagram:

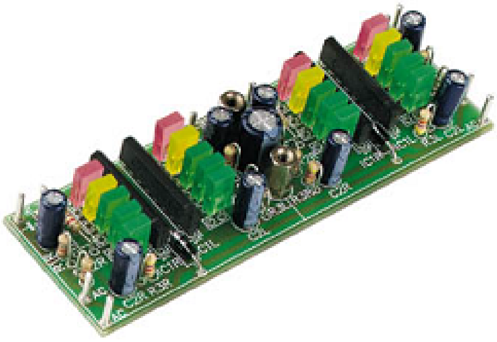


9- DUAL STEREO VU METER

دائرة لقياس مستوي الصوت باستخدام LEDs

يتكون الكارت من دائرتين لقياس مستوي الصوت واظهار الناتج علي ال LEDs (عددها ٥ LEDs)، . جهد التشغيل من ١٤-١٨ فولت، التيار المستخدم ٦٢ ميللي امبير.

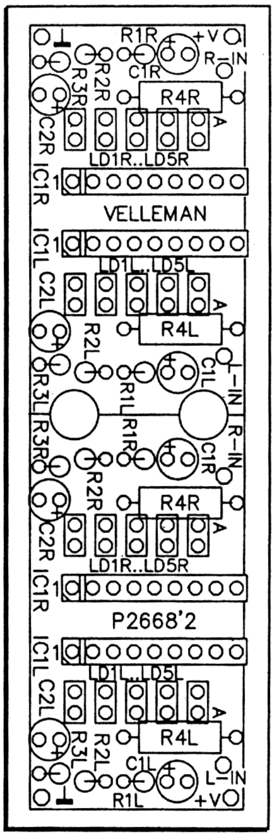
This module contains 2 stereo VU meters with 2 x 5 LED indicators.



Specifications:

1. Indication : -13, -8, -3, 0, +3dB
2. Sensitivity : 0dB = 0.775Vrms (easily adjustable)
3. Supply voltage : 14 - 18VDC / 62mA
4. PCB dimensions : 28 x 98mm (1.1" x 3.9")

PCB Top-View



Connection Diagram

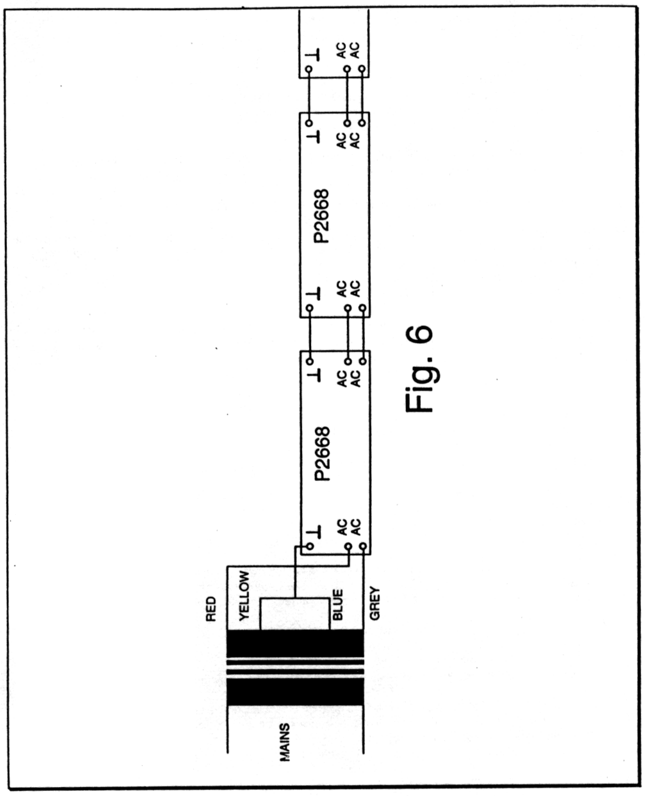


Fig. 6

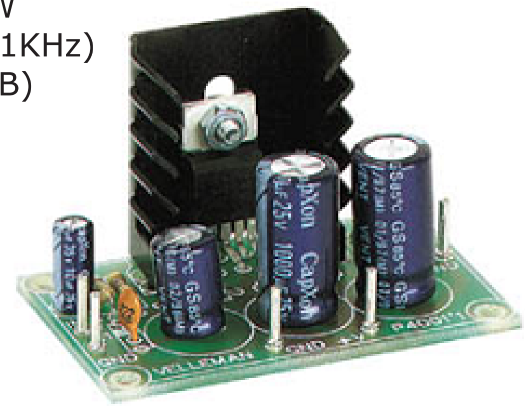
10- 7W MONO AUDIO AMPLIFIER مكبر صوت احادي قدرته ٧ وات

تمتاز الدائرة بصغر الحجم مع القدرة العالية لتوصيل الخرج من غير اي تغيرات. جهد التشغيل من ٨ - ١٨ فولت، اقصي جهد للخرج ٧ وات. التيار المستخدم ٥٠٠ ميلي امبير.

This small amplifier is constructed around the TDA2003 IC, capable of delivering 4Wrms at 4ohms. The IC is completely thermally and short-circuit protected. A conventional direct current can be connected as supply.

Specifications :

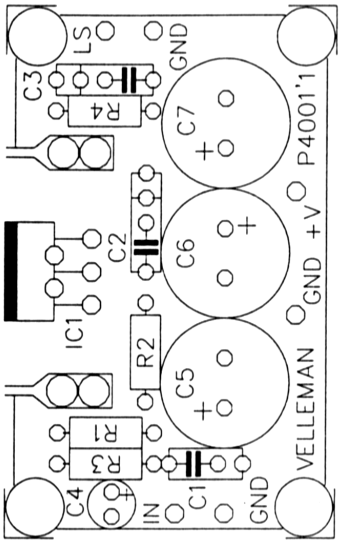
1. Music output power : 7W/4W
2. RMS output power : 3.5W/4W or 2W/8W
3. Total harmonic distortion : 0.05% (1W/1KHz)
4. Frequency response : 20Hz-20KHz (-3dB)
5. Input sensitivity : 40mV/150KW
6. Signal/noise ratio : 86dB (A weighted)
7. Thermal and short-circuit protection
8. Heatsink included
9. Power supply : 8-18VDC/0.5A
10. Dimensions : 55x35mm (2.2″ x 1.4″)



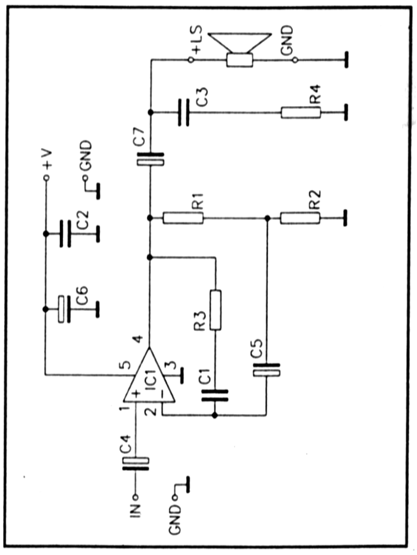
Applications :

1. Small but powerful multi-purpose amplifier
2. For use with portable audio equipment
3. Power amplifier for audio projects
4. In-car use
5. Your own unique application

PCB Top View



Circuit Diagram



11- 2 X 30W AUDIO POWER AMPLIFIER

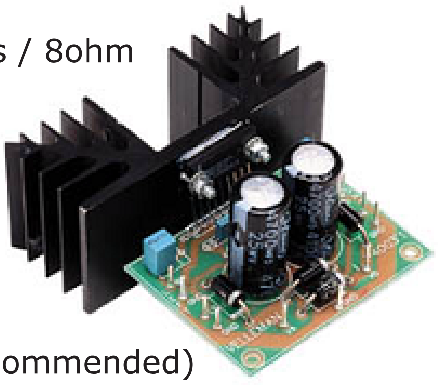
مكبر قدرة للصوت (٢ * ٣٠وات)

يمكن ان تستخدم التيار الكهربي العادي لتشغيل الدائرة وسوف تعمل بكفاءة، تعطي ١٥ وات قدرة من السماعات ٤ اوم، و١٠ وات قدرة مع السناعات ٨اوم. التيار لبمستخدم ٢ امبير؟

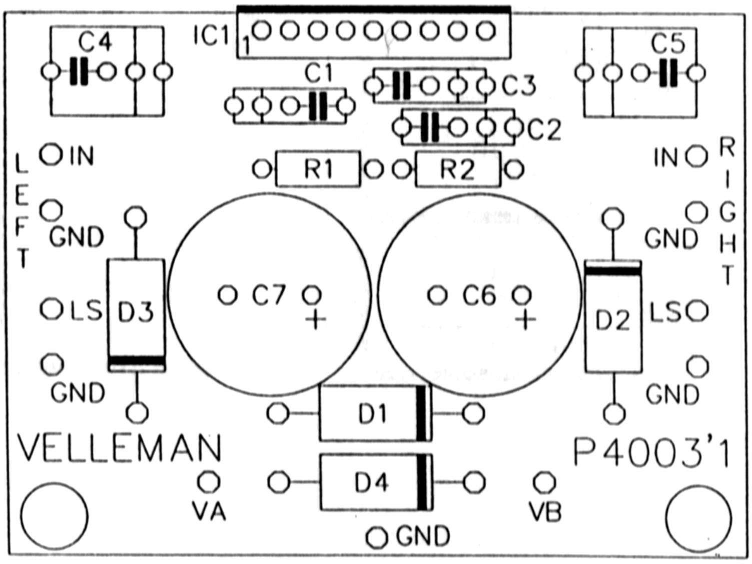
This small amplifier is constructed with the TDA1521 IC, with a maximum supply capability of 2 x 15Wrms (4ohm) of 2 x 10Wrms (8ohm). The IC is thermally and short-circuit protected. Additional rectifier and smoothing filter are unnecessary, as alternating current can be directly connected to the unit.

Specifications

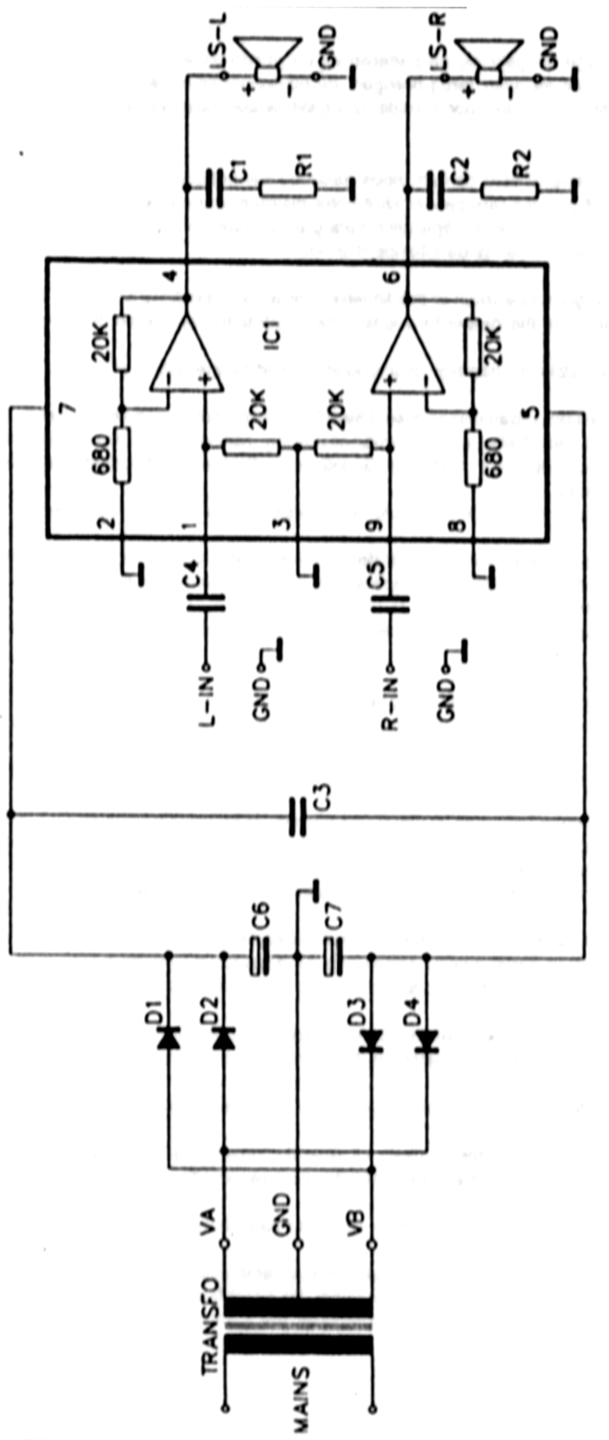
1. music power output : 2 x 30W / 4ohm
2. RMS output : 2 x 15Wrms / 4ohm or 2 x 10Wrms / 8ohm
3. total harmonic distortion : 0.07% (1W / 1KHz)
4. channel separation : 70dB
5. frequency response : 7Hz to 60KHz (-3dB)
6. signal-to-noise ratio : 98dB (A weighted)
7. input sensitivity : 300mV / 150Kohm
8. transient suppression on/off switch
9. overload and short-circuit protection : max. 1h
10. supply voltage : 2 x 12Vac / 2A (50W transfo recommended)
11. dimensions : 70 x 50mm (2.8" x 2.0")



PCB Top View



Circuit Diagram

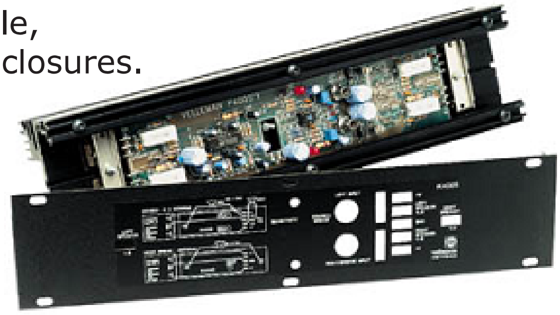


12- 400W MONO / STEREO AMPLIFIER

مكبر للصوت ٤٠٠ وات (احادي/ثنائي)

تعمل الدائرة كمكبر للصوت سواء كانت اشارة الصوت احادية MONO او ثنائية STEREO. تعمل الدائرة علي جهد ٣٠ـ ٤٥ فولت، وتعطي قدرة ٢*١٠٠ وات (سماعات ٤ اوم) او ٢*٧٥ وات (سماعات ٨ اوم).

Universal, robust and compact are the words to describe this amplifier.
Universal :
A stereo or a mono amplifier. Three input sensitivities are selectable.
Robust :
Overload and short-circuit protection, protection against incorrect power supply polarity and thermally protected too (option for K4005). Speaker transient suppression.
Compact :
The PCB housing also functions as the heatsink.
The amplifier may be used as a built-in module,
or as a free-standing unit using one of our enclosures.



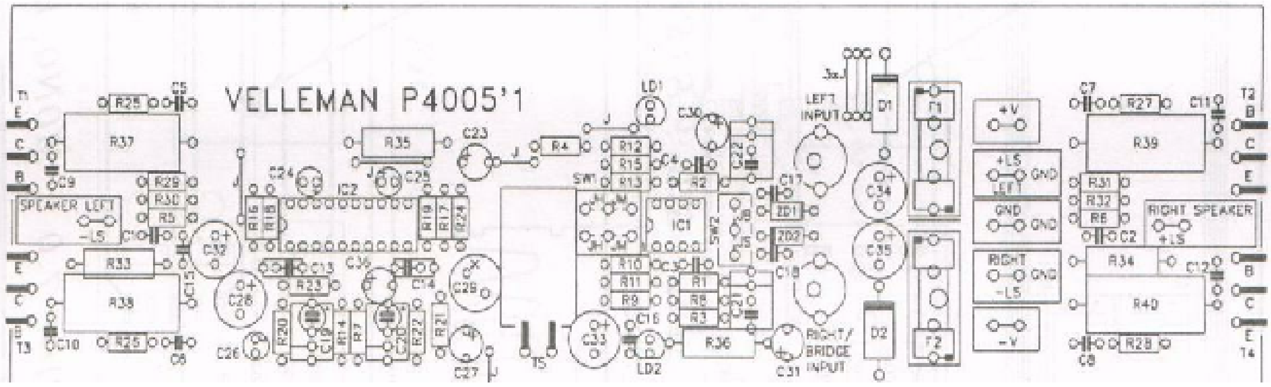
Specifications

1. rms output power : 2 x 100W / 4ohm ; 2 x 75W / 8ohm
2. rms mono-bridged power : 200W / 8ohm
3. total music output : 400W
4. harmonic distortion : 0.003% at 1KHz
5. signal-to-noise ratio : 96dB (A-weighted)
6. stereo channel separation : 76dB
7. damping factor (at 100Hz) : > 2000
8. input impedance : 22kohm
9. input sensitivity : 150mV, 300mV or 950mV switchable
10. supply voltage for 8 ohm : + 40 to 45VDC and - 40 to 45VDC / 2.5A
11. supply voltage for 4 ohm or mono : + 30 to 35VDC and - 30 to 35VDC / 5A
12. dimensions : 350 x 62 x 85mm (13.8" x 2.5" x 3.4")

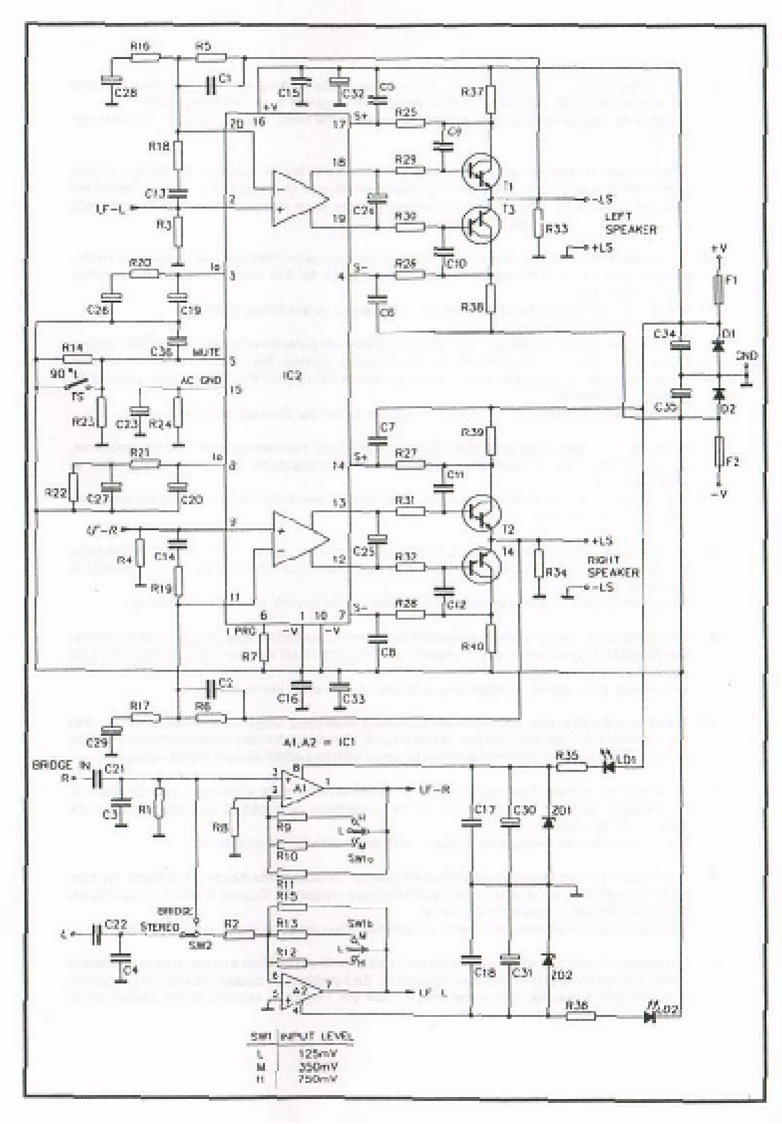
Hints

1. On the versions P4005'1 and P4005'2 the PCB printing for bridge or mono is opposite.
2. On some PCB versions are places for resitors R41,R42 and capacitors C37,C38. These components must not be mounted !
3. In case of early protection :
   Use the correct power supply.
4. Check if C1 and C2 have the value of 15pF.
5. If you are using loudspeakers with piezo tweeters inside, place a '10 Ohm / 5 Watt' resistor in series with the tweeter.

PCB Top View :



Circuit Diagram:



13- 300W MONO MOSFET AMPLIFIER

مكبر احادي MOSFET ٣٠٠ وات

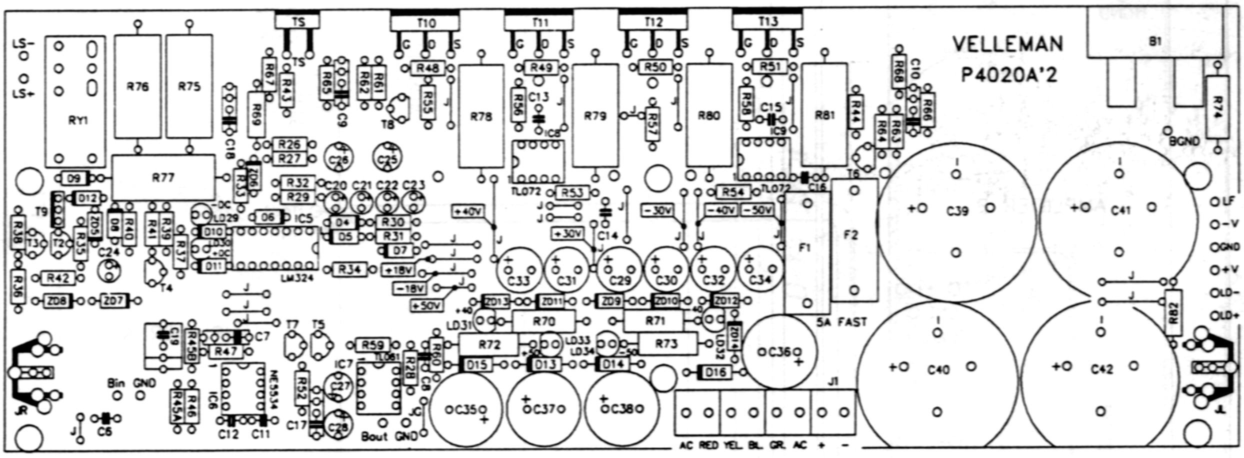
تعمل الدائرة كمكبر لاشارة الصوت الاحادية وتناسب الاستخدام في صالات الديسكو ونظم الصوت المتخصصة. قدرة الخرج ٣٠٠ وات عند استخدام سماعات ٤ اوم، و٢٠٠ وات عند استخدام سناعات ٨ اوم.

This amplifier is the mono amplifier, but comes without a housing. heatsink and transformer are included. Ideally suited for installation in disco bars and active speaker systems.

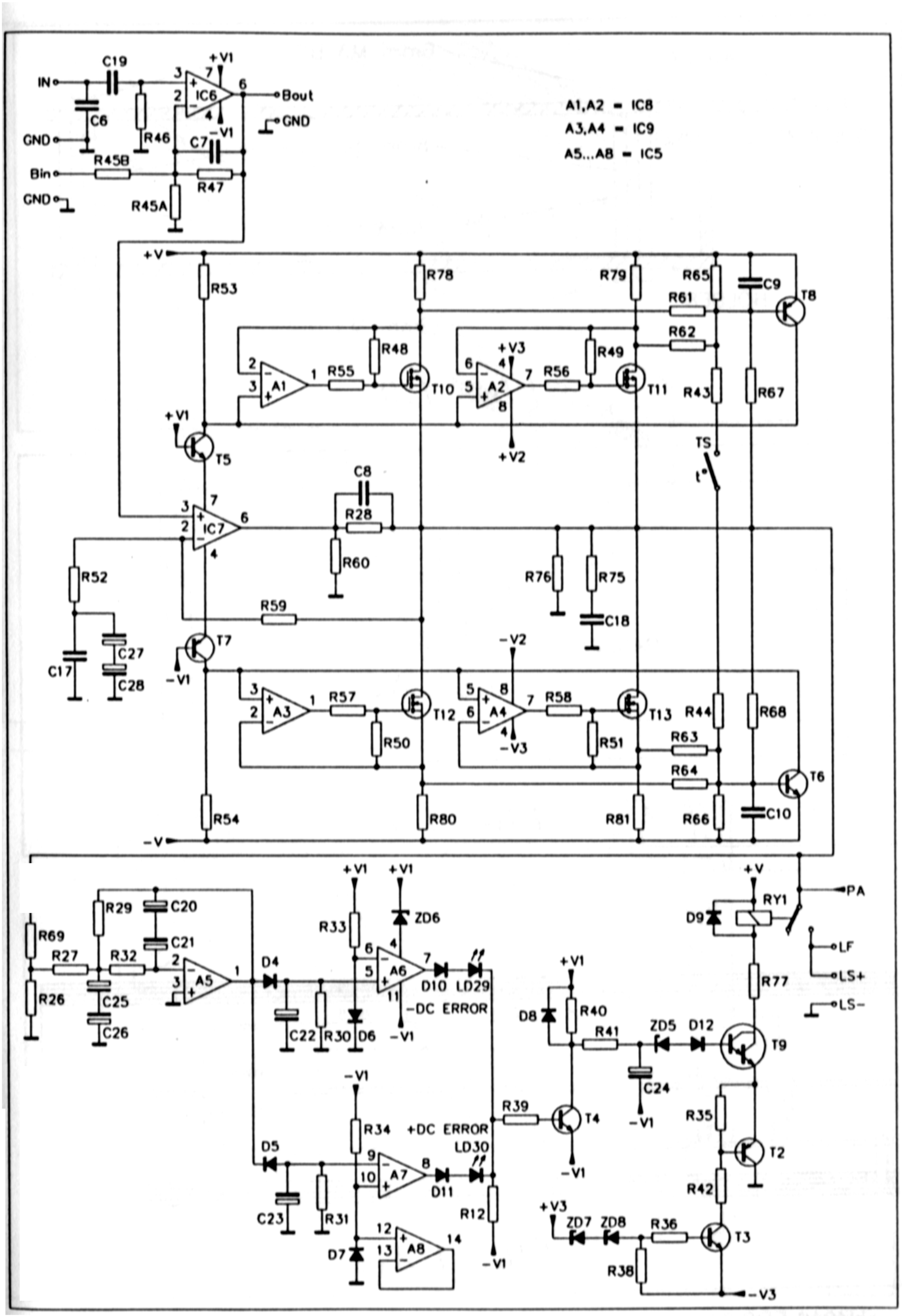
Specifications

1. music power : 300W / 4ohm ; 200W / 8ohm
2. rms power : 155W / 4ohm ; 100W / 8ohm
3. harmonic distortion : 0.005%
4. damping factor : > 600
5. input sensitivity : 1Vrms
6. signal-to-noise ratio : 112dB (A-weighted)
7. frequency response : 3Hz - 120kHz
8. speaker switch-on delay and protection
9. thermal and short-circuit protection
10. dimensions : 270 x 90 x 140mm (10.6" x 3.5" x 5.5")
11. weight : 4.8Kg

PCB Top View :



Circuit Diagram



H4010-ED2-33

14- 600W MONO / STEREO MOSFET AMPLIFIER

مكبر للصوت (MOSFET) قدرته ٦٠٠ وات

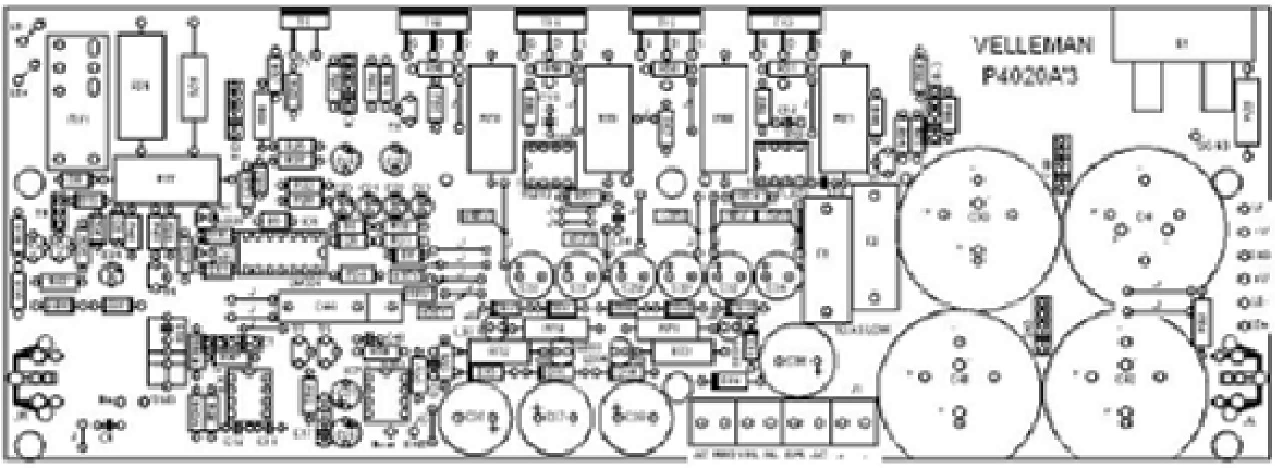
تناسب الدائرة المواصفات القياسية لقياس مستوي نقاء الصوت، باستخدام الدوائر المناسبة تستطيع الدائرة توفير القدرة المفقودة من الدوائر المعتادة، وتعمل مع الاشارات الصوتية الاحادية او الثنائية، اقصي قدرة للخرج ٣٠٠ وات عند استخدام سماعات ٤ اوم، و ٢٠٠ وات عند استخدام سناعات ٨ اوم.

This audio power amplifier meets the strictest standards for quality and robustness. Using a very special circuit the end stage is always set to CLASS A, without any unnecessary loss of power. That is why it is called "EFFICIENT CLASS A". It is made up of two separate mono amplifiers. By switching both channels into a bridge configuration, a mono amplifier with double power is obtained.
A major advantage of this amplifier kit is that NOT A SINGLE ADJUSTMENT is needed to any of the settings ! It comes complete with heatsinks, transformers, housing and front panel. Optionally>

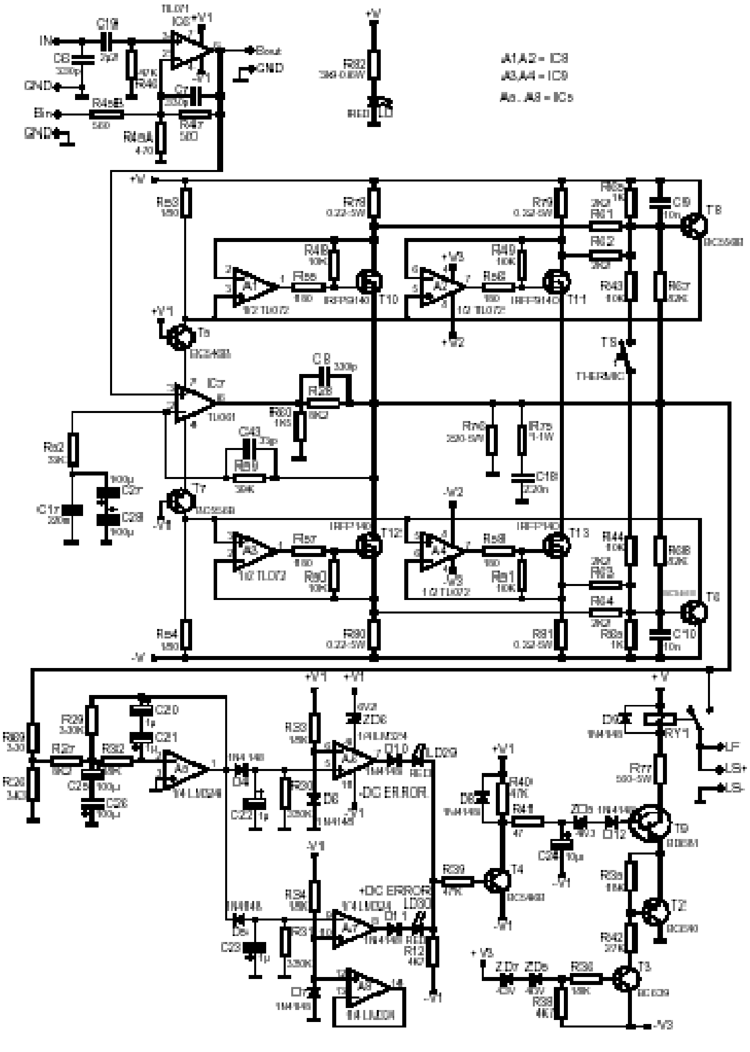
Specifications

1. Music Power : 2 x 300W / 4ohm ; 2 x 200W / 8ohm
2. rms Power : 2 x 155W / 4ohm ; 2 x 100W / 8ohm
3. Bridged power : 600W music / 8ohm
4. harmonic distortion : 0.005%
5. damping factor : > 600
6. input sensitivity : 1Vrms
7. signal-to-noise ratio : 112dB (A-weighted)
8. frequency response : 3Hz - 120kHz
9. speaker switch-on delay and protection
10. thermal and short-circuit protection
11. dimensions : 425 x 90 x 355mm (16.7" x 3.5" x 14.0")
12. weight : 11kg

PCB Top View



Circuit Diagram



15 - POWER METER

دائرة قياس مستو قدرة الصوت

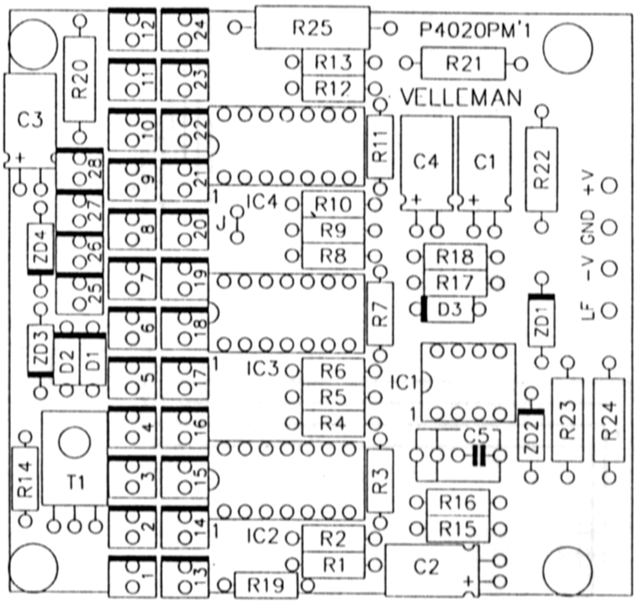
تستخدم هذه الدائرة في مكبرات الصوت لإظهار قدرة الصوت بعد مرحلة التكبير. جهد التشغيل ٤٠ فولت.

This is built into the MOSFET amplifier in order to display amplifier power output. The meters are mounted behind the correct scale, which is also illuminated, according to the speakers connected to the amplifier (4 or 8 ohms). When the amplifier is switched into a bridge configuration, then both meters may be connected in series.

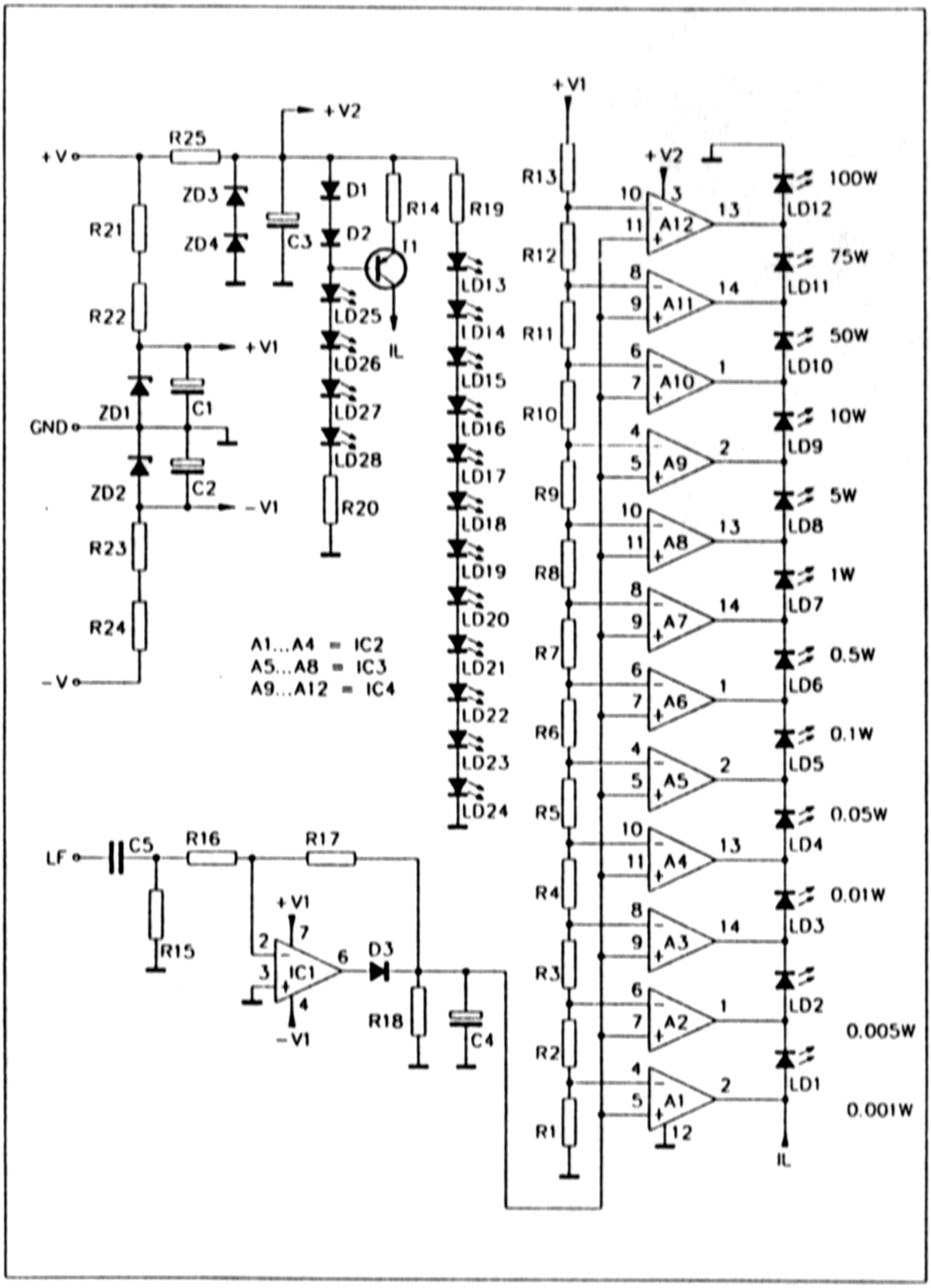
Specifications

1. stereo scale (vertical) : 0.001 to 100W / 8ohm ; 0.002 to 200W / 4ohm, divided over 12 LEDs
2. scale distribution with mono bridge configuration (horizontal) : 0.001 to 400W / 8ohm divided over 24 LEDs
3. 2 x 16 LEDs for scale illumination
4. supply voltage : + and - 40V from **{** HYPERLINK "http://www.velleman.be/product.asp?id=9197" **}**

PCB Top View



Circuit Diagram



16- DIGITAL CONTROLLED PREAMPLIFIER

دائرة مكبر ابتدائي بنظام التحكم الرقمي

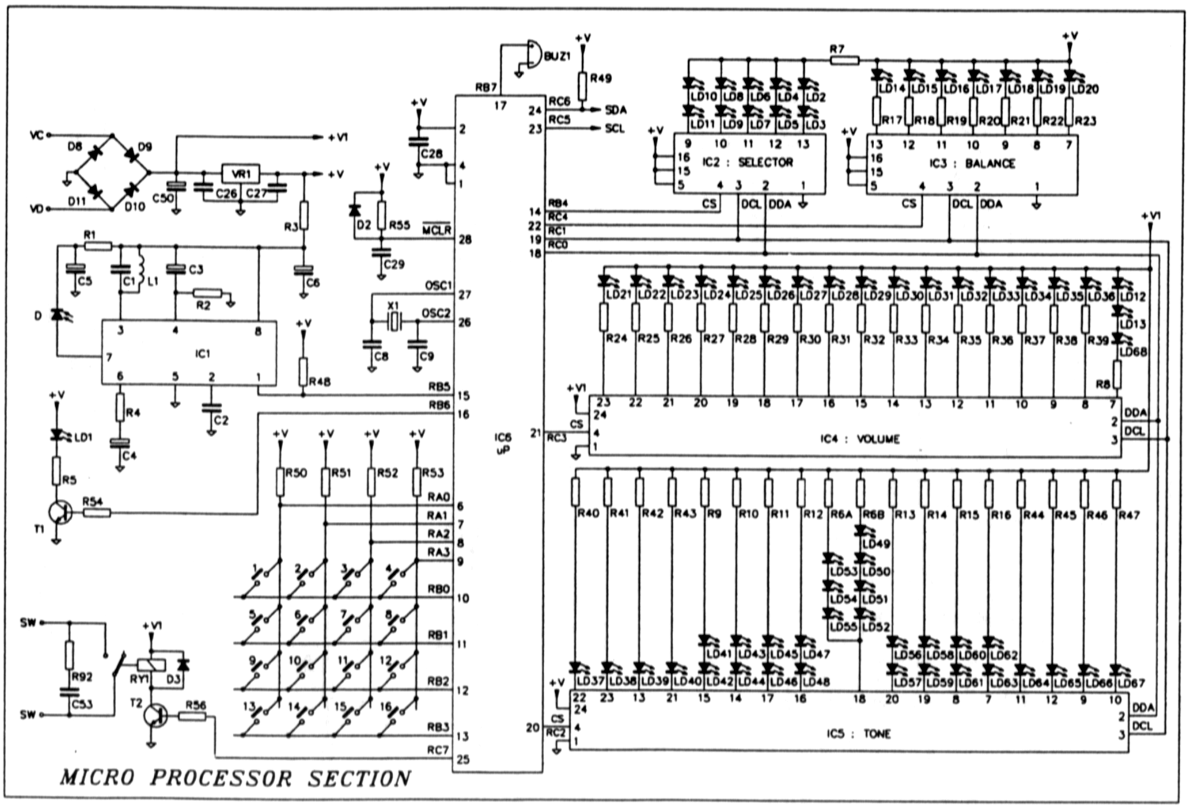
تعمل هذه الدائرة كمكبر ابتدائي للصوت، مع الخاصية الرقمية اي ان التحكم في الدائرة ومميزاتها يتم عن لوحة التحكم التي تعمل باللمس، وتعطيك الدائرة نفس الخواص للاجهزة المتخصصة من تحكم في الصوت، توازن للسماعات، واختيار الدخل. تيار الخرج ٥ امبير اقصي قدرة للاستهلاك ٦ وات.

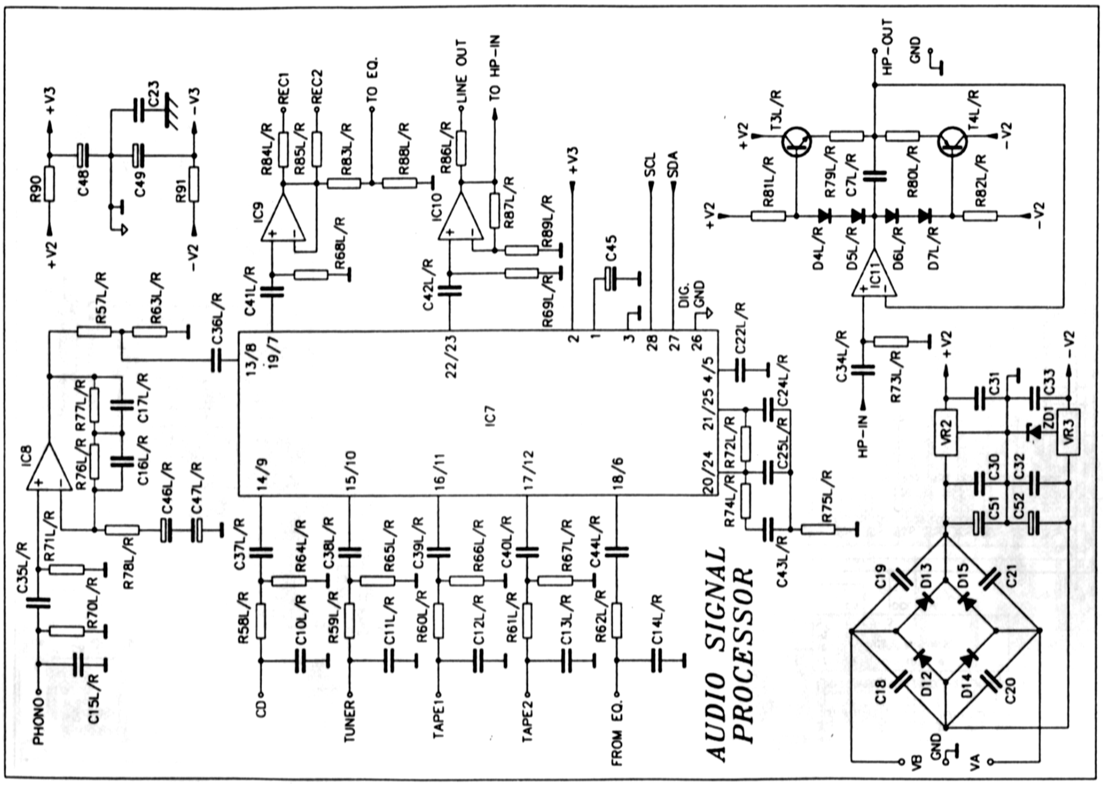
All functions, such as volume, tone control, balance and input selection can be operated using push buttons and a LED display gives a clear indication of all settings. All functions may be operated with a remote control unit. A switched mains power output has also been provided, which allows the rest of the installed equipment to be switched on and off using the remote control unit. Your own priority settings can be programmed in, which become the default setting when the unit is switched on, and can be recalled at any time.

Specifications

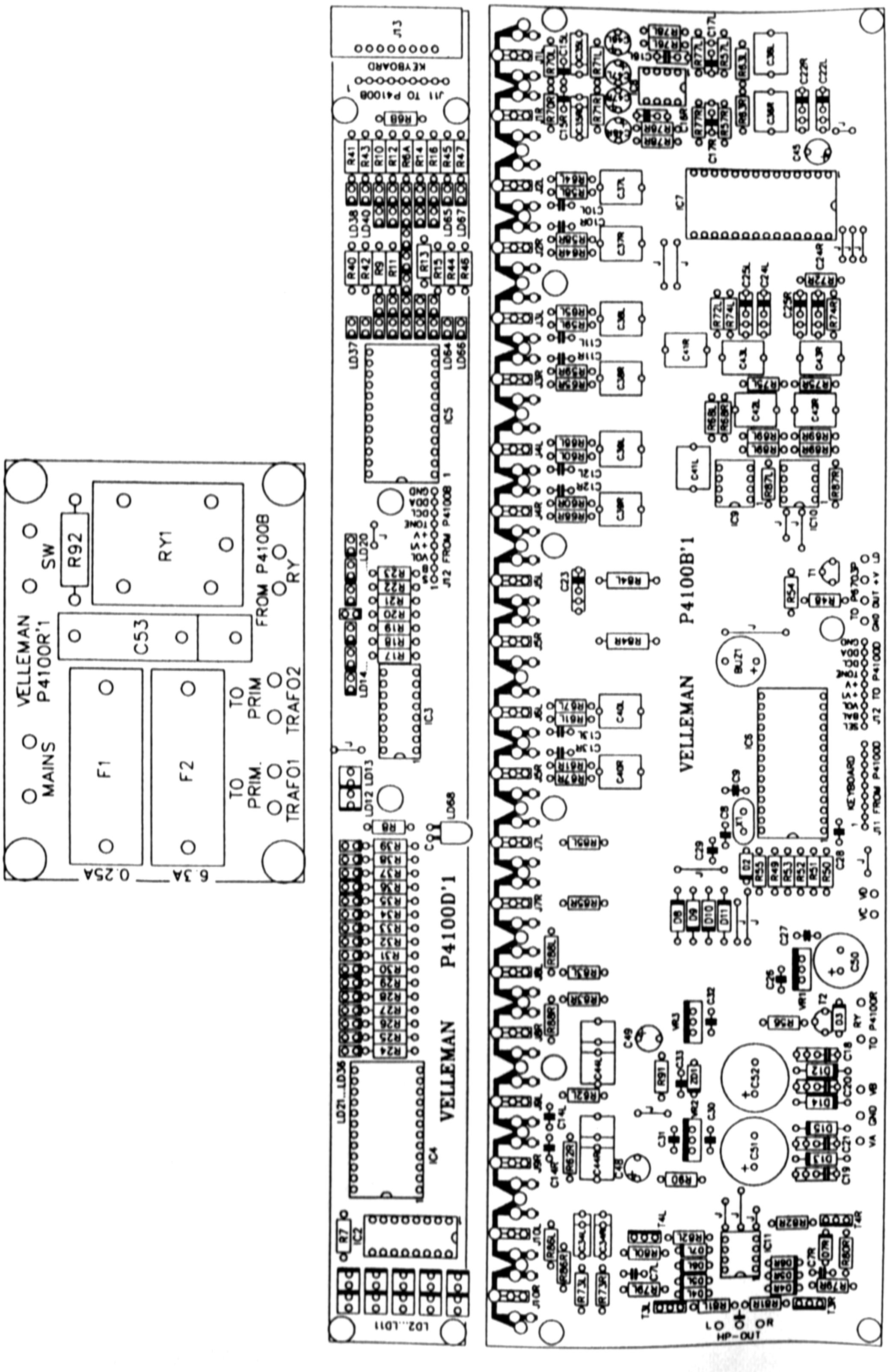
1. Input sensitivity :
    PHONO : 5.5mV / 50Kohm
    CD : 500mV / 32Kohm
    TUNER, TAPE1 & 2 : 360mV / 22Kohm
2. Output level :
    LINE : 1V
3. Signal-to-noise ratio (A weighted) :
    PHONO : 75dB
    TAPE, CD, TUNER : 100dB
4. Total harmonic distortion : 0.01%
5. Frequency response : 8Hz - 150kHz (-3dB)
6. Channel separation : 90dB
7. Cross talk : -99dB
8. Headphones output : 280mW / 32ohm
9. Mains output : 5A
10. Consumption : 6W max.
11. Dimensions : 425 x 50 x 350mm (16.7" x 2.0" x 13.8")
12. Weight : 5Kg

Circuit Diagram





PCB Top View


VELLEMAN
P4100R'1
MAINS
SW
R92
RY1
C53
F1
F2
FROM P4100B
RY
TO PRIM. TRAFO1
TO PRIM TRAFO2
0.25A
6.3A
VELLEMAN
P4100D'1
J13
KEYBOARD
J11 TO P4100B
J12 FROM P4100B
IC2
IC3
IC4
IC5
LD2...LD11
LD21...LD36
LD68
VELLEMAN
P4100B'1
IC7
IC9
IC10
IC11
BUZ1
J11 FROM P4100D
J12 TO P4100D
TO P4100R
TO P4703P
HP-OUT
LO
OR
C50
C51
C52

17- IR TRANSMITTER

دائرة ارسال بواسطة الأشعة تحت الحمراء

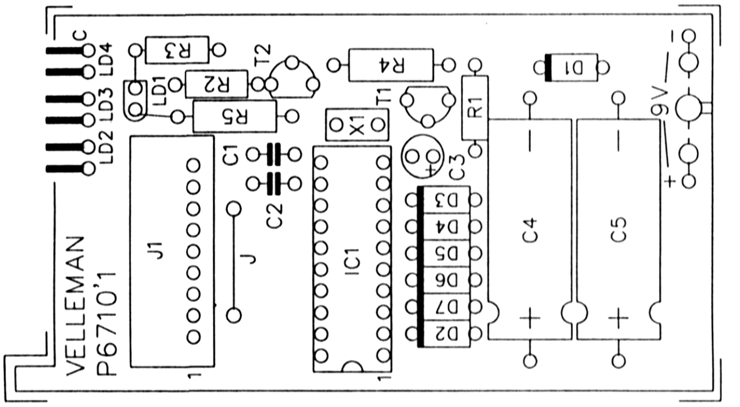
تعد هذه الدائرة من الدوائر المكملة لسلسلة الدوائر المتحكمة في الصوت، حيث تعمل الدائرة كريموت للتحكم عن بعد في دائرة الراديو السابقة مع خاصية تخزين المحطات المفضلة لديك. جهد التشغيل ٩ فولت.

A special key has been provided, which allows the memory content (or stations in the case of the tuner) to be preserved. Not only its versatility, but also its aluminum housing and the special tactile keyboard makes this remote control unit kit unique.

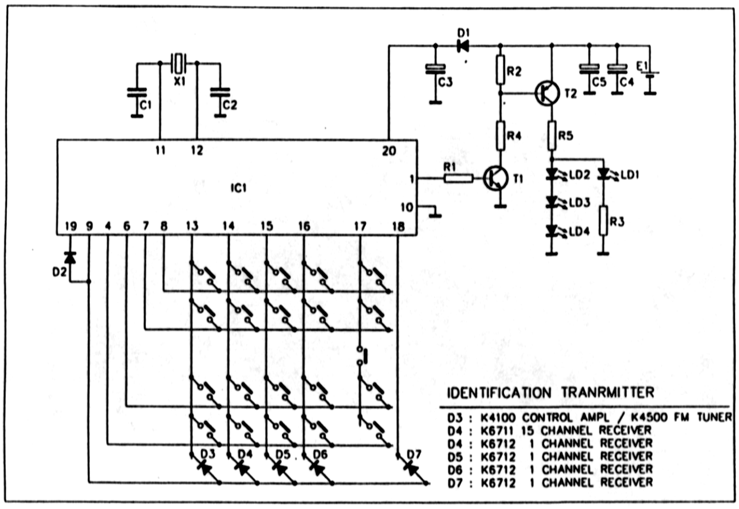
Specifications:

1. Transmitter/receiver range : ±30 m
2. Supply voltage : 9V battery (not incl.)
3. Dimensions : 50 x 22 x 175mm (2.0" x 0.9" x 6.9")

PCB Top View



Circuit Diagram


X1
C1
C2
IC1
D1
C3
R2
T2
C5
C4
E1
R4
R5
R1
T1
LD2
LD1
LD3
LD4
R3
D2
D3
D4
D5
D6
D7
IDENTIFICATION TRANRMITTER
D3 : K4100 CONTROL AMPL / K4500 FM TUNER
D4 : K6711 15 CHANNEL RECEIVER
D4 : K6712 1 CHANNEL RECEIVER
D5 : K6712 1 CHANNEL RECEIVER
D6 : K6712 1 CHANNEL RECEIVER
D7 : K6712 1 CHANNEL RECEIVER

18- GUITAR HEADPHONE AND PREAMPLIFIER

مكبر صوت ابتدائي للجيتار

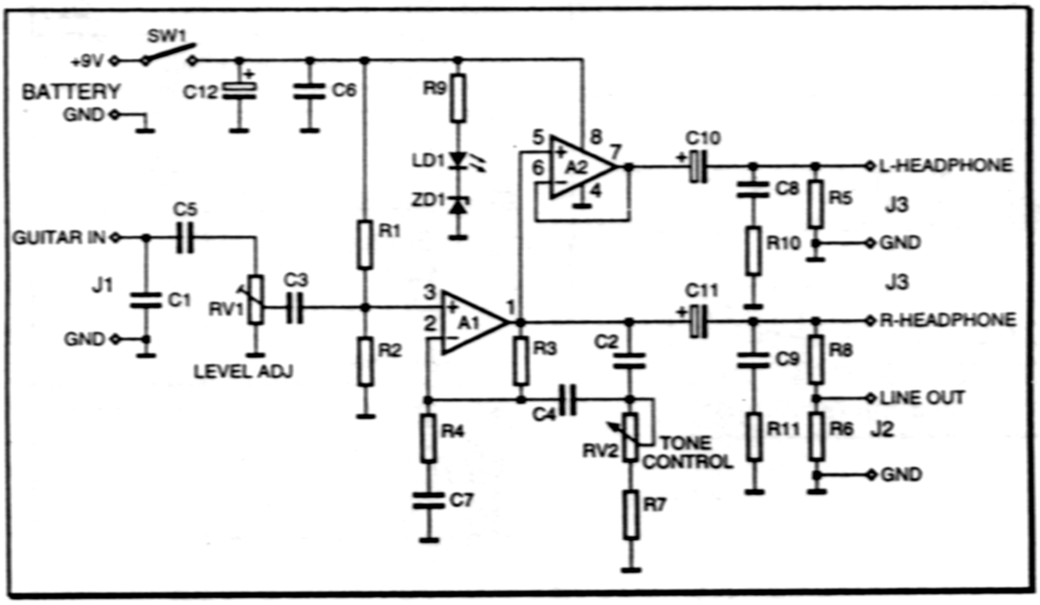
تم تصميم هذه الدائرة حيث تناسب استخدام من يريد ان يتدرب علي الجيتار، حيث ان الجيتار يختلف عن اي آلة موسيقية اخري فلا يتم توصيله لأيجهاز تكبيركما يمكن استخدام سماعات الأذن لكي يستمع للصوت او النغمة التي يعزفها. جهد التشغيل ٩ فولت، اقصي قدرة للخرج ٢ * ٥٠ ميللي وات عند استخدام سماعات ٣٢ اوم.

An electric guitar cannot be connected to just any amplifier or audio installation. This pre-amplifier has been designed for this purpose and provides you with a headphone output, allowing you to practice without disturbing others. Moreover, it is fitted with a special device for tone adjustment, allowing anyone to create their personal sound.

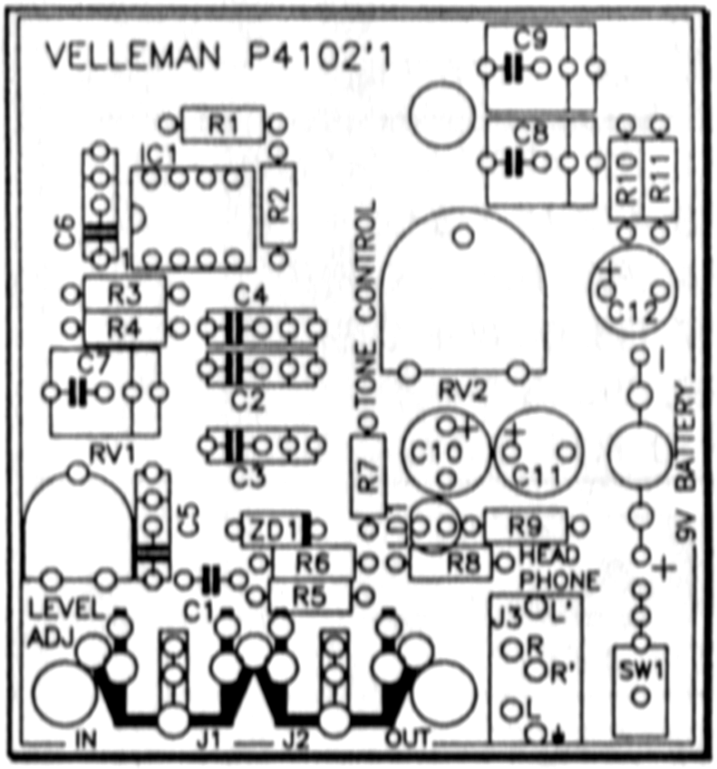
Specifications

1. sound adjustment
2. adjustable input sensitivity
3. low noise
4. headphones output : max. 2 x 50mW / 32ohm
5. housing included
6. power supply : 9V battery
7. dimensions : 70 x 30 x 105mm (2.8" x 1.2" x 4.1")

PCB Top View :



Circuit Diagram:

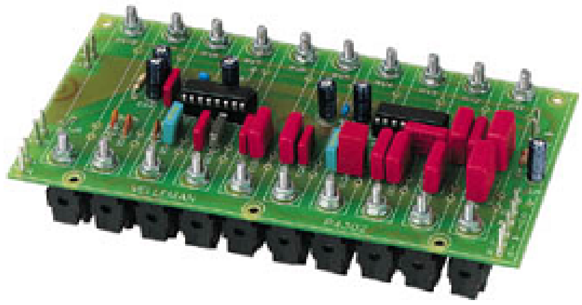


19- 10 BAND GRAPHIC EQUALISER

اكواليزر بياني ١٠ نطاقات

تتيح لك الدائرة حرية ضبط الصوت علي المستوي والكفاءة التي تريدها، كما يمكن توصيل الدائرة الي اي جهاز ستريو. الحيز الترددي ٥ هرتز ١٠٠ ك هرتز. جهد الشغيل ١٠ فولت، التيار المستخدم ١٠ ميلي امبير.

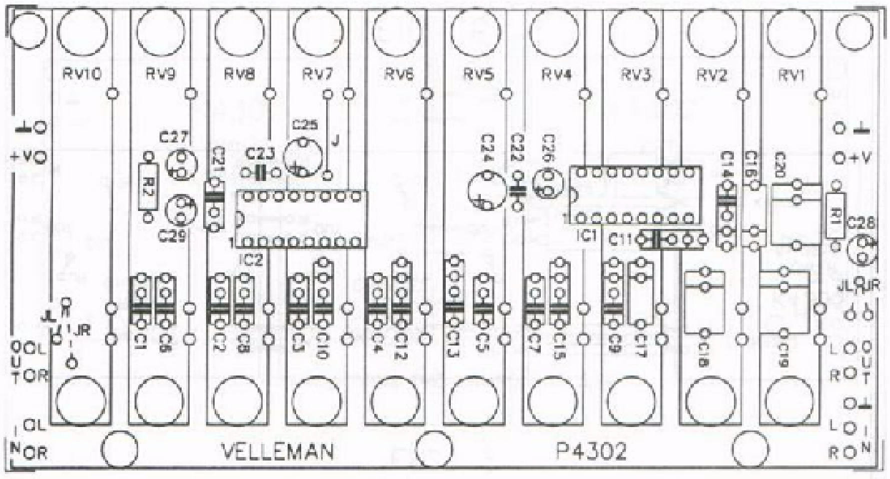
This equalizer enables you to adjust the entire audio spectrum to suit your own taste, octave by octave. The equalizer is built in such a way that it can be easily extended to stereo applications.



Specifications

1. Number of bands : 10
2. Centre frequencies : 32, 64, 125, 250, 500, 1K, 2K, 4K, 8K, 16KHz
3. Frequency range (controls set to zero) : 5Hz to 100KHz (-3dB)
4. Gain (controls set to zero) : 0dB
5. Control range : -10dB to + 10dB
6. Total harmonic distortion (1KHz / 0dB) : < 0.02%
7. Signal-to-noise ratio (controls at zero) : > 110 dB (A-weighted)
8. Channel separation (1KHz / 0dB) : > 95dB
9. Max. output voltage : 2.5Vrms
10. Input impedance : 4.7Kohm
11. Power supply : 10VDC / 10mA regulated
12. PCB dimensions : 140 x 80mm (5.5" x 3.2")

PCB Top View :



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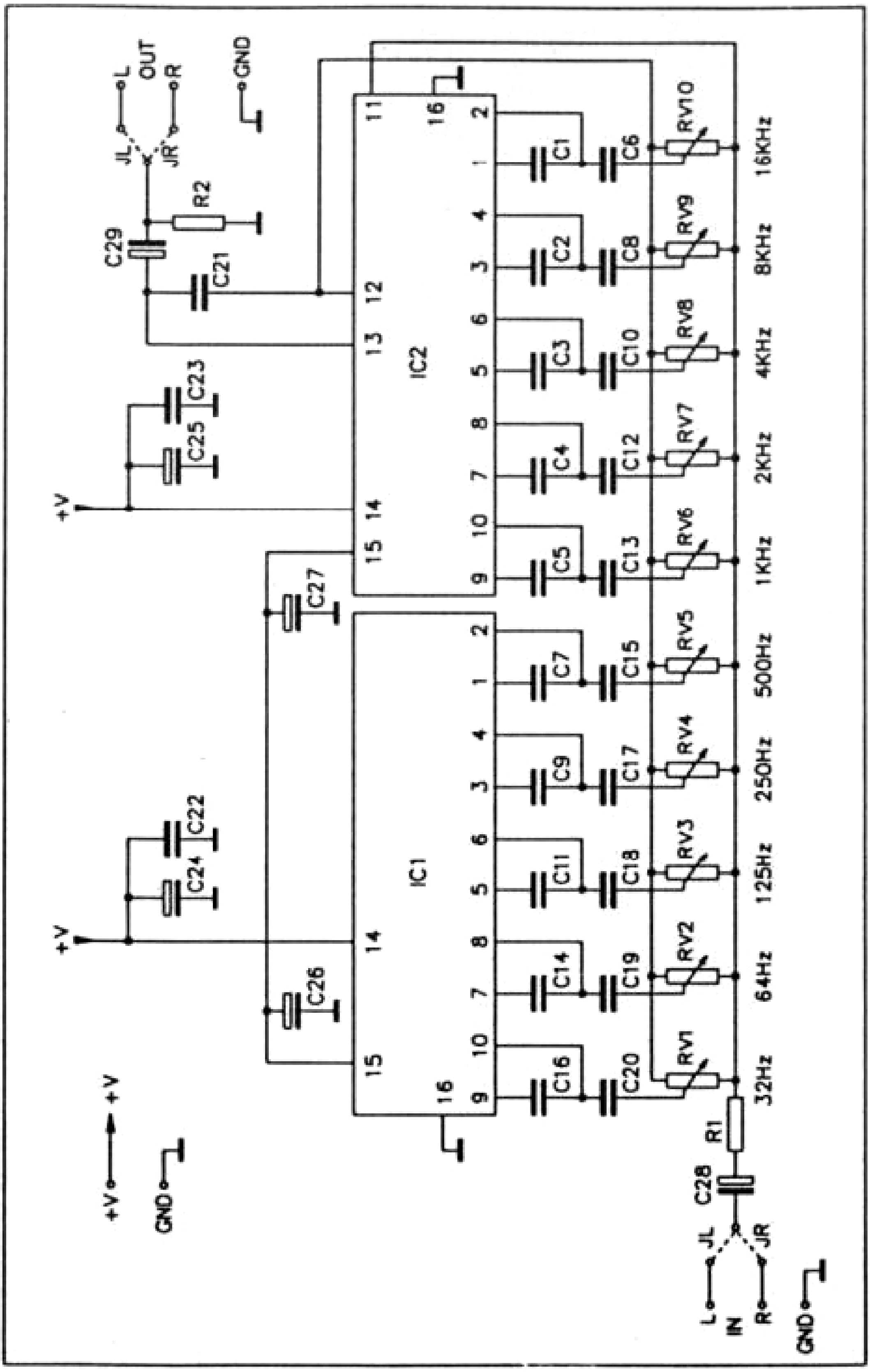
Circuit Diagram:



20- POWER SUPPLY AND SWITCHING MODULE

مصدر قدرة وكارت فتح وغلق

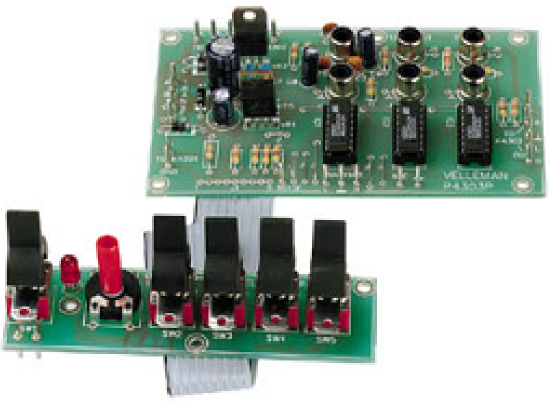
تتكون الدائرة من جزيئين:

١- كارت توصيل القدرة الكهربية وتتكون من محول كهربي، وكلا من وحدات الادخال والاخراج.

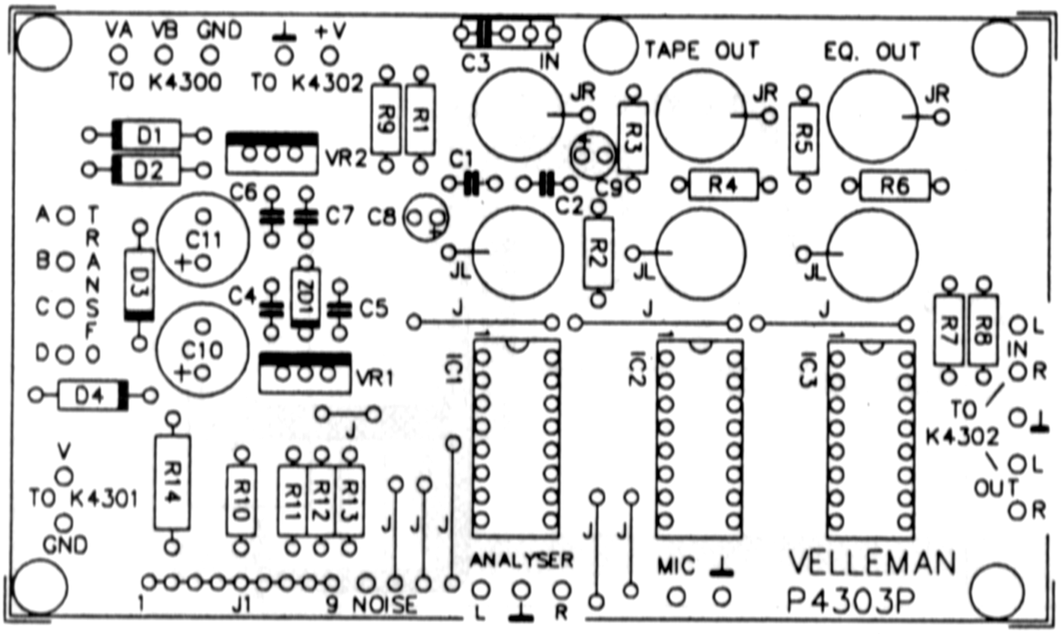
٢- كارت التحكم، ويتحكم في تشغيل وايقاف الدائرة، التحكم في الدخل، التحكم في الخرج، والتحكم في مستوي الاكواليزر.

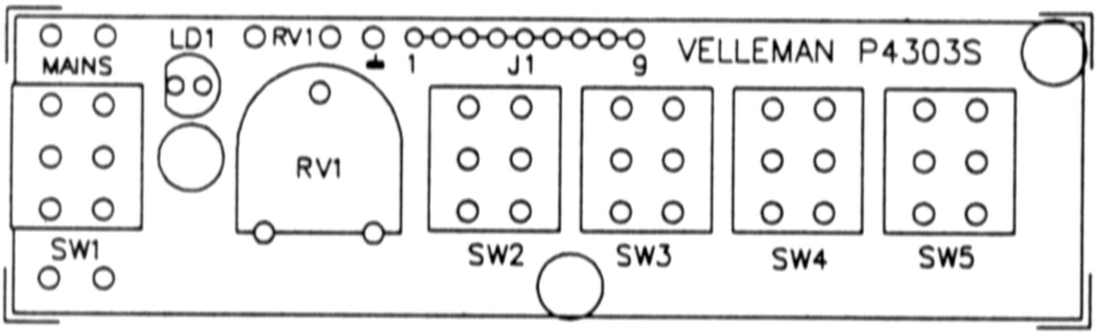
الجهد المستخدم ٢ *١٢ فولت، التيار المستخدم ١ امبير.

This kit consists of 2 parts :
1. Power supply and connection module (on the back panel). This consists of : power supply for all models (transformer 2 x 12Vac / 1A not included ; equalizer connections : EQUALISER IN - EQUALISER OUT - TAPE OUT.
2. Switching module for all functions of the spectrum analyzer and the equalizer. This consists of : mains switch ON / OFF + Led indicator ; Equalizer input PINK NOISE/LINE ; Tape output : LINE/EQUALISER ; Analyzer input : LINE/EQUALISER ; Level control for the spectrum analyzer.

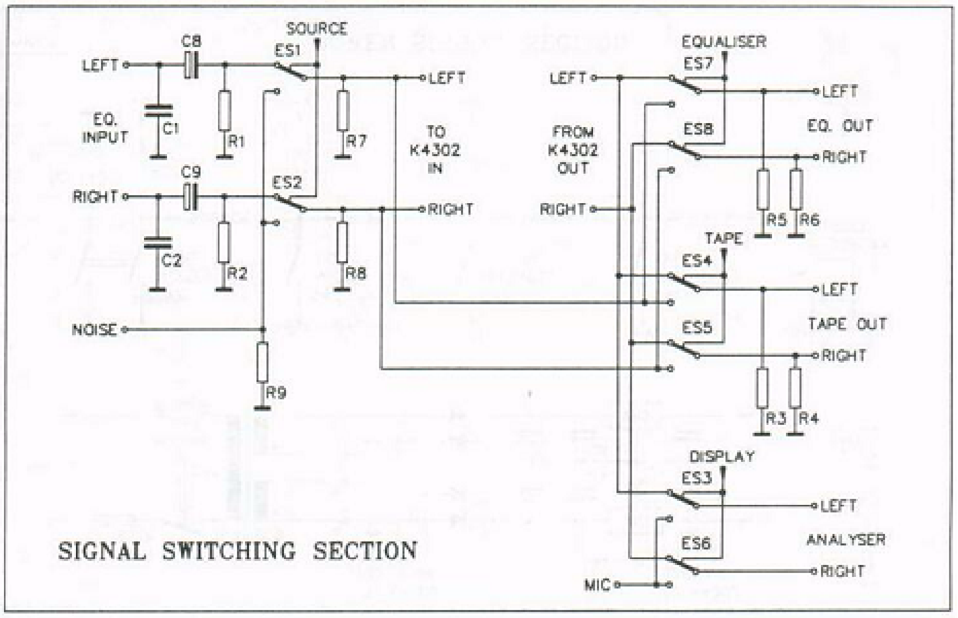


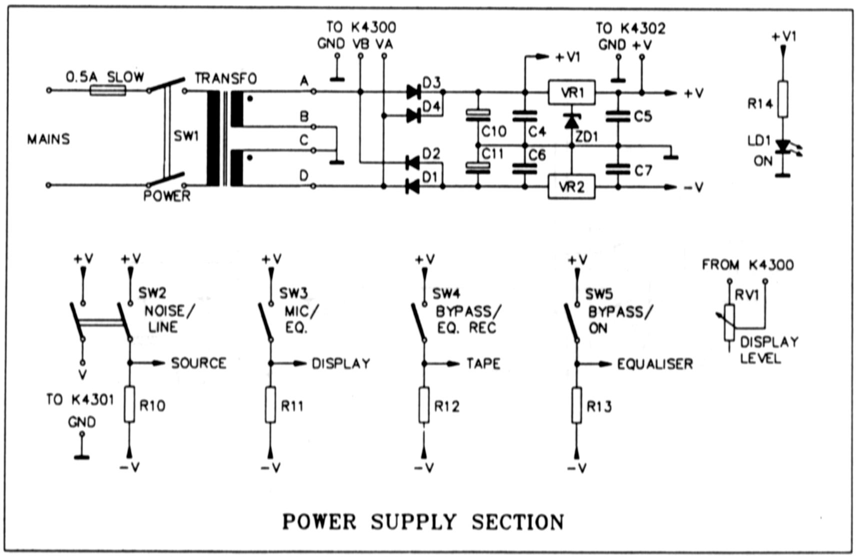
PCB Top View :





Circuit Diagram:


SIGNAL SWITCHING SECTION


POWER SUPPLY SECTION

21- MONO VU-METER 10 LEDS

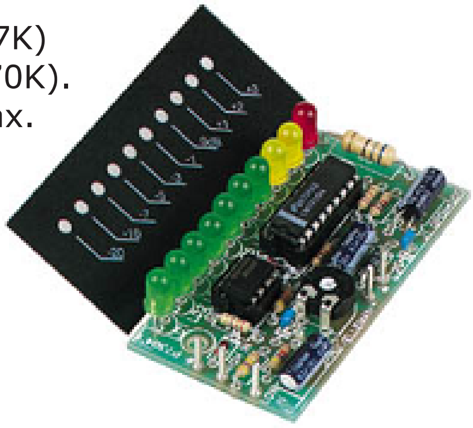
دائرة لقياس مستوي الصوت عن طريق ١٠ LEDs

تتكون الدائرة من ١٠ LEDs ، ويمكن التحكم في مستوي الصوت الداخل للدائرة. الجهد المستخدم ١٠-١٥ فولت، التيار المستخدم ١١٠ ميلي امبير.

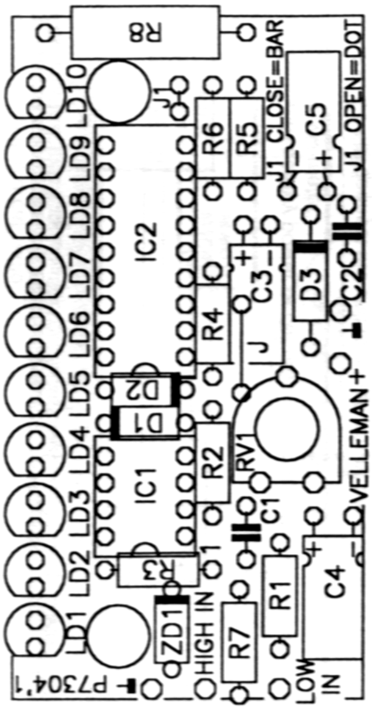
VU meter with a scale consisting of 10 LEDs and an adjustable input. Dot or bar indicator. Supplied with 1 front panel suitable for horizontal or vertical mounting.

Specifications:

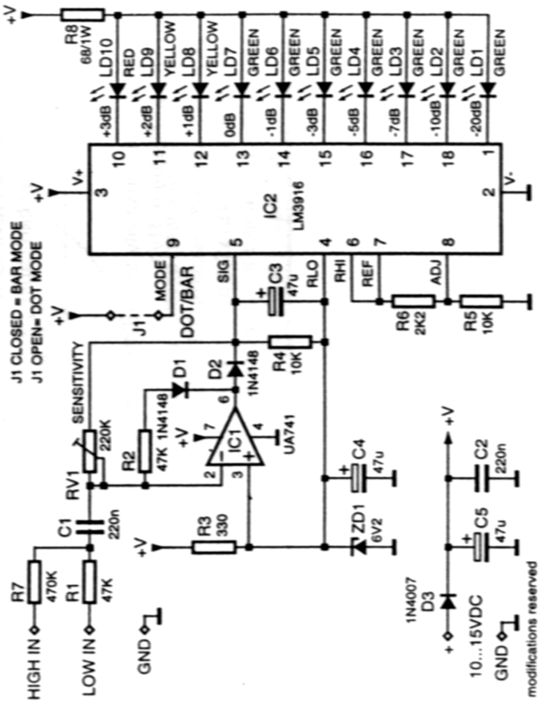
1. 1 X 10 LED's
2. BAR OR DOT MODE
3. INDICATION RANGE: 0dB = 0.775mVrms.
   -20dB, -10dB, -7dB, -5dB, -3dB, -1dB, 0dB, +1dB, +2dB, +3dB
4. FREQUENCY RANGE: 20Hz tot 30KHz
5. LOW INPUT FOR 0dB: 150mV to 6Vrms (47K)
6. HIGH INPUT FOR 0dB: 1.5V to 60Vrms (470K).
7. POWER SUPPLY: 10 to 15VDC / 110mA max.
8. PCB DIMENSIONS: 68X37mm



PCB Top View



Circuit Diagram



22- STEREO VU-METER 2 x 10 LEDS

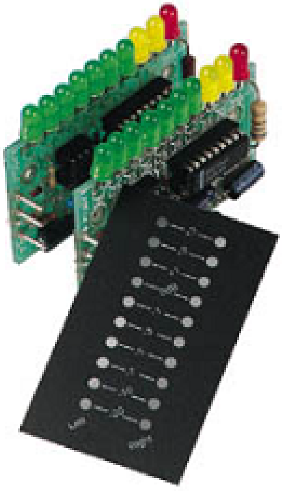
دائرة لقياس مستوي الصوت (ستريو) عن طريق ٢ * ١٠ LEDs

تتكون الدائرة من ٢٠ LEDs ، ويمكن التحكم في مستوي الصوت الداخل للدائرة. الجهد المستخدم ١٠ – ١٥ فولت، والتيار المستخدم ٢٥٠ ميلي امبير.

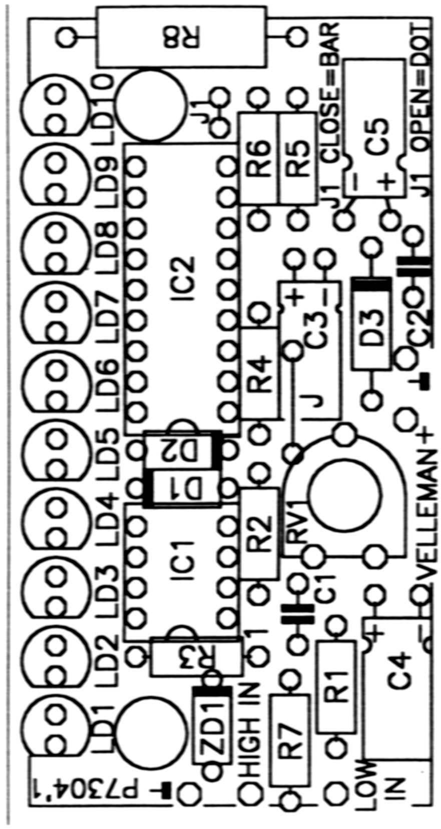
Stereo VU meter with 2 x 10 LEDs (dot or bar indicator) and an adjustable input. Included in package: 1 front panel suitable for horizontal or vertical mounting.

Specifications

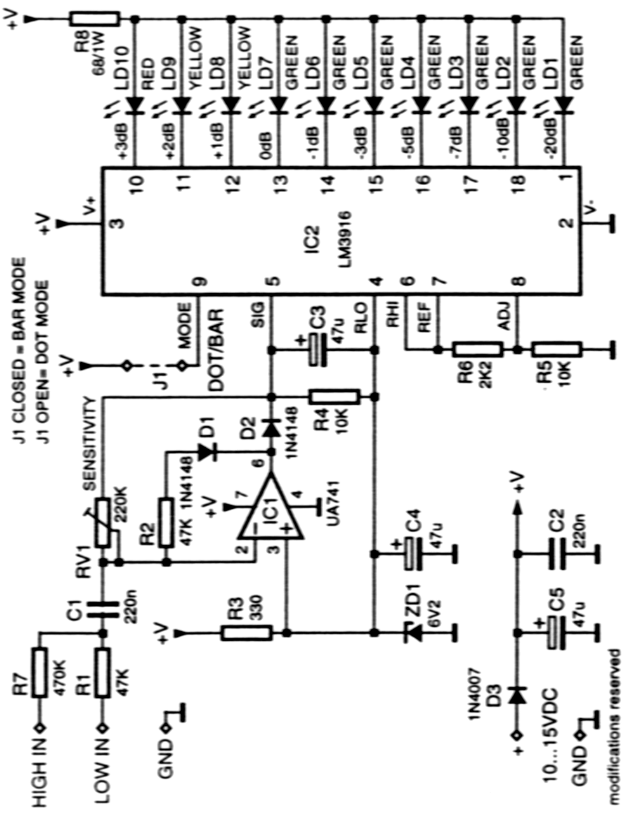
1. Range : -20dB to +3dB
2. Power supply : 10 - 15VDC / 250mA
3. Input sensitivity :
   Low input : 150mV to 6Vrms (47K)
   High input : 1.5V to 60Vrms (470K)
4. Dimensions : 37 x 68mm (1.5" x 2.7") (x2)



PCB Top View



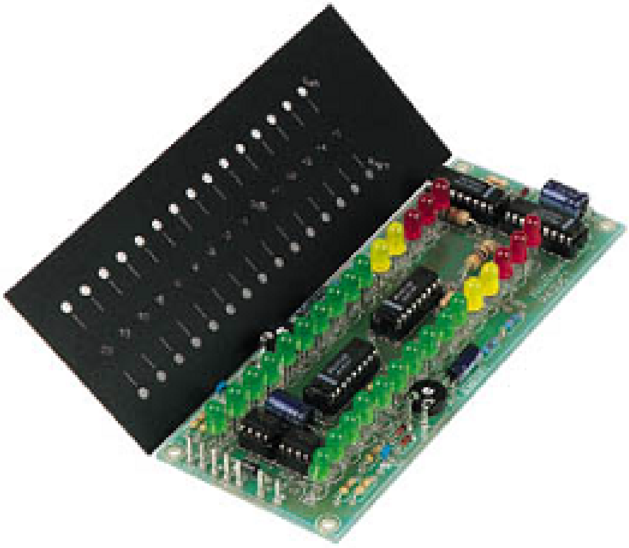
Circuit Diagram



23- PRECISION STEREO VU-METER 2 X 15 LEDS

دائرة دقيقة لقياس مستوي الصوت (ستريو) عن طريق ٢ * ١٥ LEDs

تستخدم الدائرة لرؤية الموجات الصوتية. كما يمكن استخدامها مع لوحات مزج الصوت، المكبرات، ونظم الصوت للسيارات. تتيح لك الدائرة حرية التوصيل علي كلا من الدخل المنخفض (الكاسيت، نظم الاستريو، ومشغل الاقراص المدمجة) او علي الدخل العالي (نظم السماعات المعتادة). الجهد المستخدم ١٢ ١٥- فولت، التيار المستخدم ٣٠٠ ميلي امبير. الحيز الترددي (٢٠ هرتز – ٣٠ ك هرتز).



Features

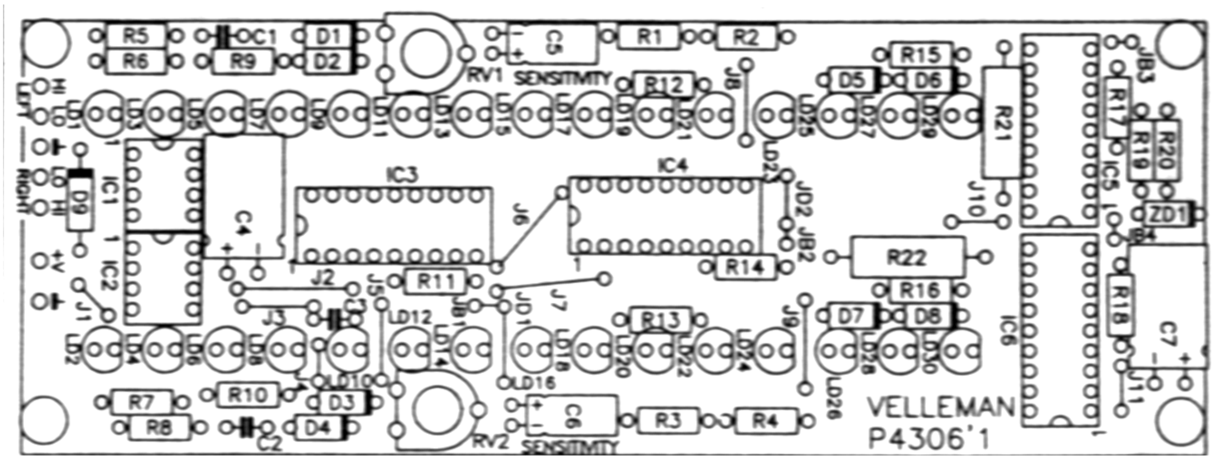
For visualization of audio signals.

1. Can be used with mixing panels.
2. Use with mixing panels, amplifiers, car audio systems…
3. Easily connects to the line-level output (LOW INPUT) from any tape deck, stereo system, or CD player.
5. A special input (HIGH INPUT) is provided, so that the unit can directly be connected to the speaker output of most systems.
6. To make it universal, the readout can be set as DOT or BAR indication.
7. The supplied display window for vertical or horizontal mounting makes the unit very attractive.
8. If wanted, the unit can be calibrated by the means of a trim potentiometer.

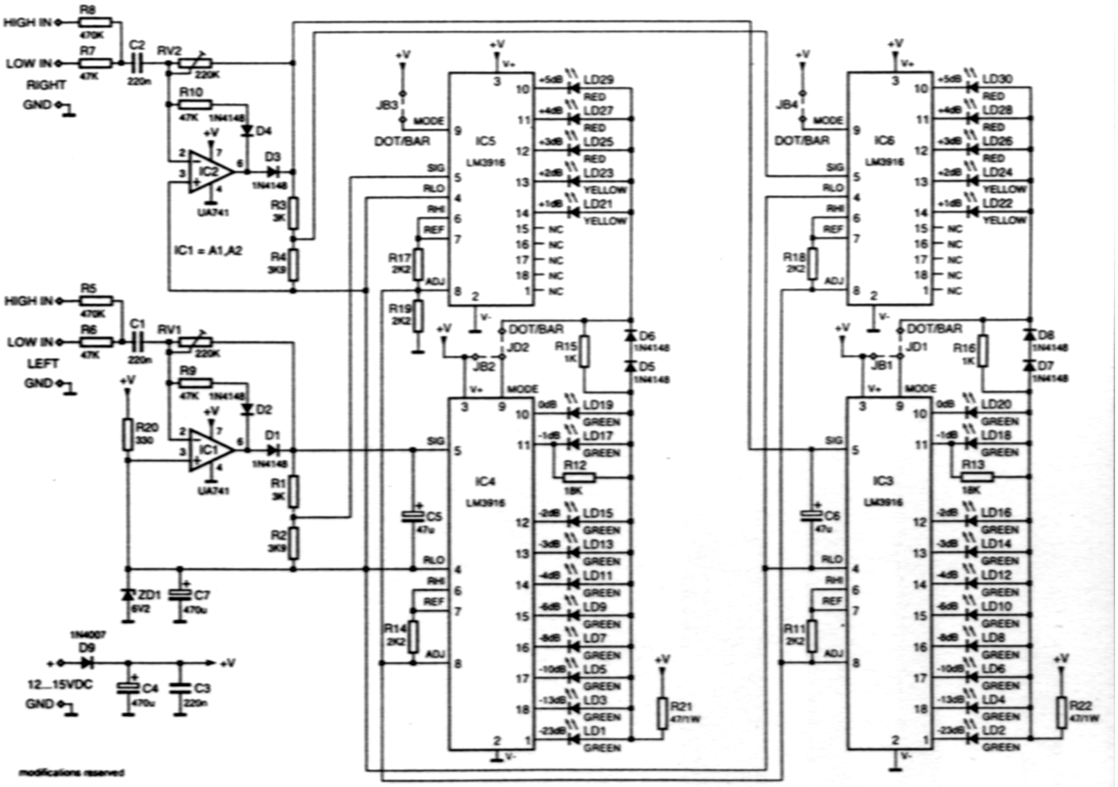
Specifications

1. scale from : -23dB to +5dB (linear scale between -4 and +5dB)
2. precision : ± 0.5dB (1KHz)
3. input impedance :
   Low input: 150mV - 5Vrms
   High input: 1.5V - 50Vrms
4. frequency range : 20Hz - 30kHz (-3dB)
5. power supply : 12 - 15VDC / 300mA
6. dimensions : 150 x 57mm (5.9" x 2.2")

PCB Top View:



Circuit Diagram

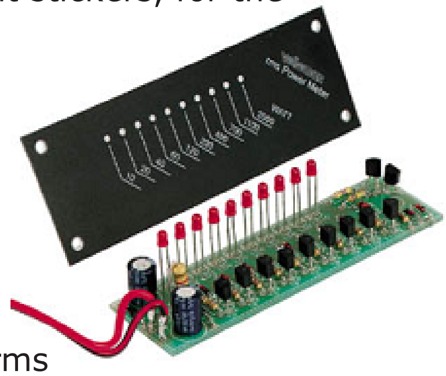


24- AUDIO POWER METER

دائرة قياس قدرة الصوت

تمتاز الدائرة بصغر الحجم وامكانية توصيلها علي السماعات او نظم الصوت للسيارات. ويمكن للدائرة قياس الصوت حتي قدرة ٢٠٠٠ وات ولا تحتاج الي مصدر قدره حيث تتغذي من خرج السماعات.

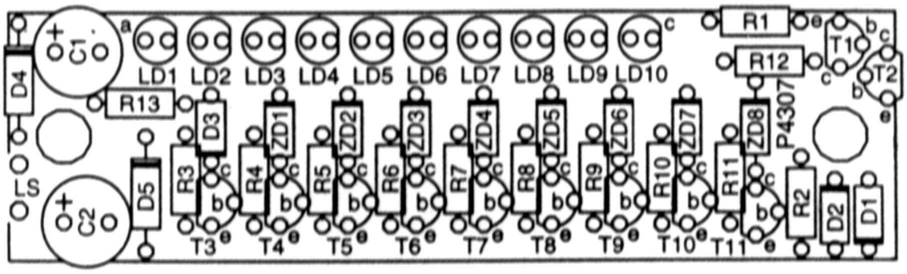
10 LED scale, up to 2000Wrms power measurements. Does not need a special power supply, because it is supplied directly from the speaker output. Ideal for car audio systems and PA systems. Also usable for bridged amplifiers. The unit can be used both horizontal and vertical. The kit comes with a front panel and four attractive front stickers, for the different scales.



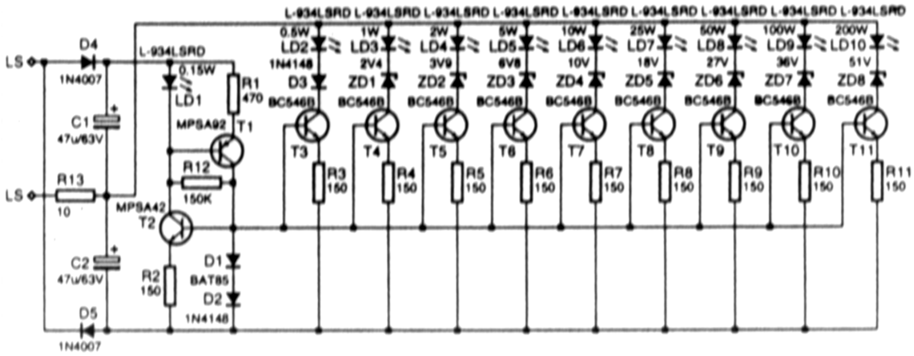
Specifications

1. Four different scales :
   at 4 ohm load in low power mode : 0.3 to 400Wrms
   at 4 ohm load in high power mode : 10 to 2000Wrms
   at 8 ohm load in low power mode : 0.15 to 200Wrms
   at 8 ohm load in high power mode : 5 to 1000Wrms
2. Minimum input sensitivity : 1.1Vrms (low power mode)
3. Maximum input voltage : 130Vpeak (high power mode)
4. Current consumption : 25mA at full scale
5. Luminous intensity : 8 to 20mcd / LED
6. Dimensions : 120 x 40 x 28mm (4.7" x 1.6" x 1.1")

PCB Top View:



Circuit Diagram:



25- SOUND GENERATOR

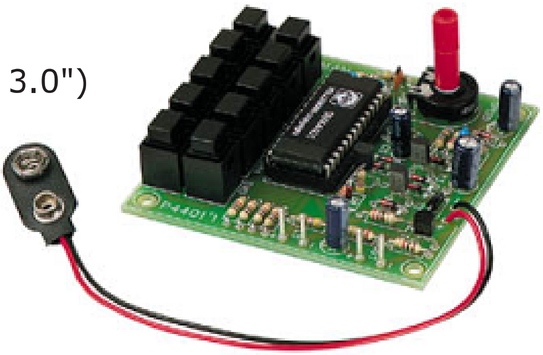
دائرة مولدة للصوت

تناسب الدائرة كلا من الهواة او المحترفين، يمكنك بها ان تولد ١٠ نغمات مختلفة لتعطي للصوت الاصلي بعض الاثارة.
الجهد المستخدم ٨ – ١٠ فولت، والتيار المستخدم ١٠٠ ميلي امبير. اقصي قدرة للسماعات ١ وات.

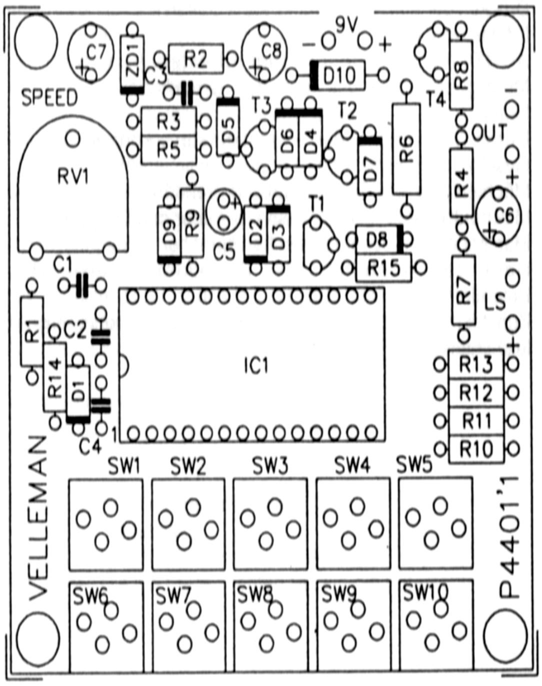
The ideal device for DJ's, jingles for radio stations or just to attract attention. With one output for direct connection to a speaker and one line output for connecting to a mixer panel or amplifier. The following effects may be generated directly by means of a push button : Machine gun · European siren · Phasor gun · Racing car with motor howl · Screeching of car tires on a curve · Explosion · Mortar fire followed by explosion · Music : "Wild charge tune" or "Snake charmers tune" · US siren

Specifications

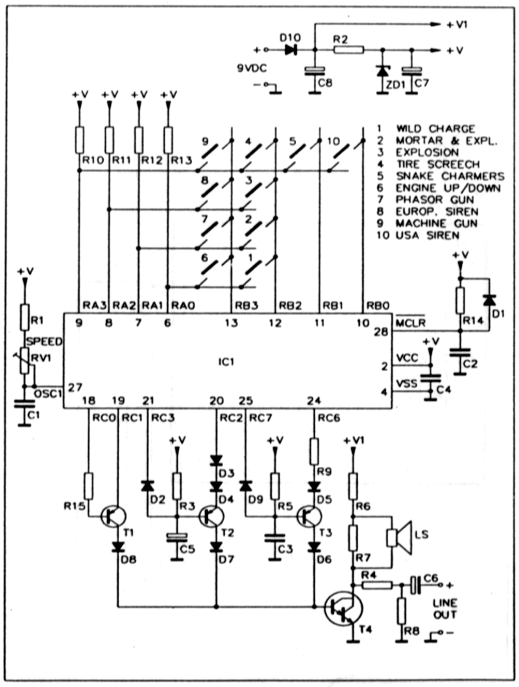
1. supply voltage : 8 - 10VDC / 100mA or 9V battery
2. line output : 1Vrms
3. speaker output : 1W
4. PCB dimensions : 75 x 75mm (3.0" x 3.0")



PCB Top View:



Circuit Diagram:



26- TELEPHONE AMPLIFIER

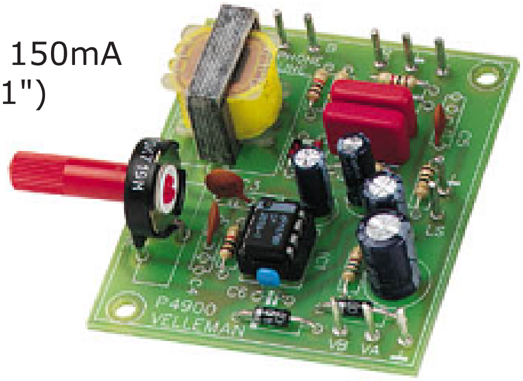
دائرة مكبر للتليفون

يمكن ان تضاعف عدد المستمعين او ان تسجل المكالمة التليفونية، وتتناسب الدائرة برامج الراديو التي تعتمد علي الحوار بين اكثر من مذيع مع الضيف. خرج السماعات ٠,٥ وات عند استخدام سماعات ٨ اوم. الجهد المستخدم ٩ – ١٢ فولت (تيار مستمر).

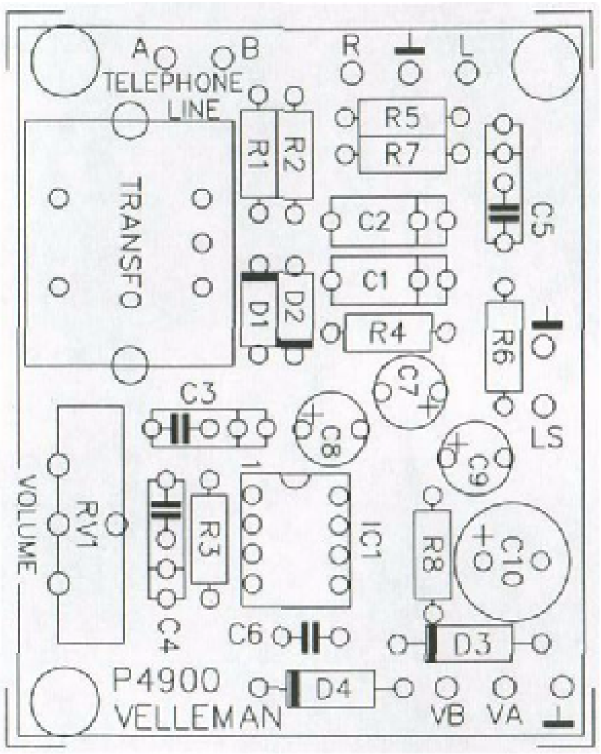
This telephone amplifier may be used as a free-standing amplifier with speaker, e.g. to listen to a telephone conversation, or the output may be connected to an amplifier or mixing panel (e.g. radio stations).

Specifications

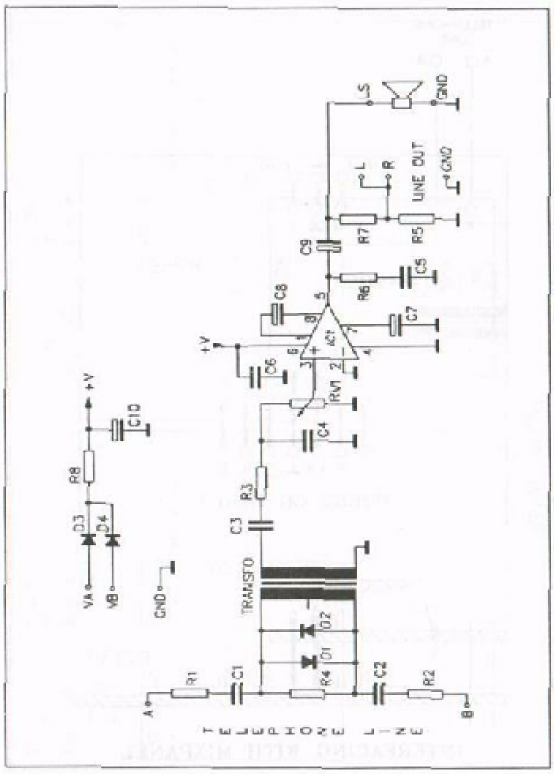
1. Input : isolation transformer interface
2. Speaker output : 0.5W / 8ohm
3. Line output : 0dB (0.775Vrms)
4. Power supply : 7 - 9VAC or 9 - 12VDC / 150mA
5. PCB dimensions : 63 x 52mm (2.5" x 2.1")



PCB Top View:



Circuit Diagram:



27- MONO 90Wrms VALVE POWER AMPLIFIER MODULE

كارت مكبر للقدرة بواسطة الصمامات (احادي ٩٠ Wrms)

يمكن ان تكون جهازك الصوتي الخاص بواسطة هذا الكارت المنفرد التصميم، الذي يجمع بين صغر حجم الدائرة والقدرة العالية علي اعطاء اعلي النتائج. الحيز الترددي ٢ هرتز – ١٢٥ ك هرتز. اقصي قدرة مستهلكة ٢٣٠ وات.

Upgrade your guitar amp, jukebox or construct your own audio system with this superb valve amplifier module. Plenty of power, very low distortion, excellent bass response, this amp will satisfy even the most critical listener. It comes complete with PCB, toroidal custom made power and output transformers, all necessary valves and an extensive manual.

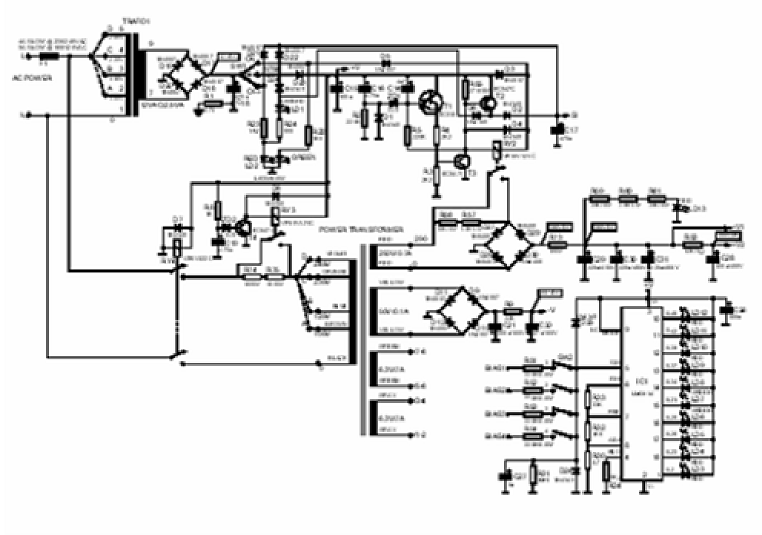
Features

1. 4 quality EL34 valves in push-pull combination
2. Easy bias adjustment with LED readout
3. Standby mode stretches valve life
4. Soft start circuit prevents mains fuse tripping at power-up
5. No-compromise quality components
6. Custom made oversized toroid output and power transformers
7. One single PCB ensures hassle free assembly and wiring

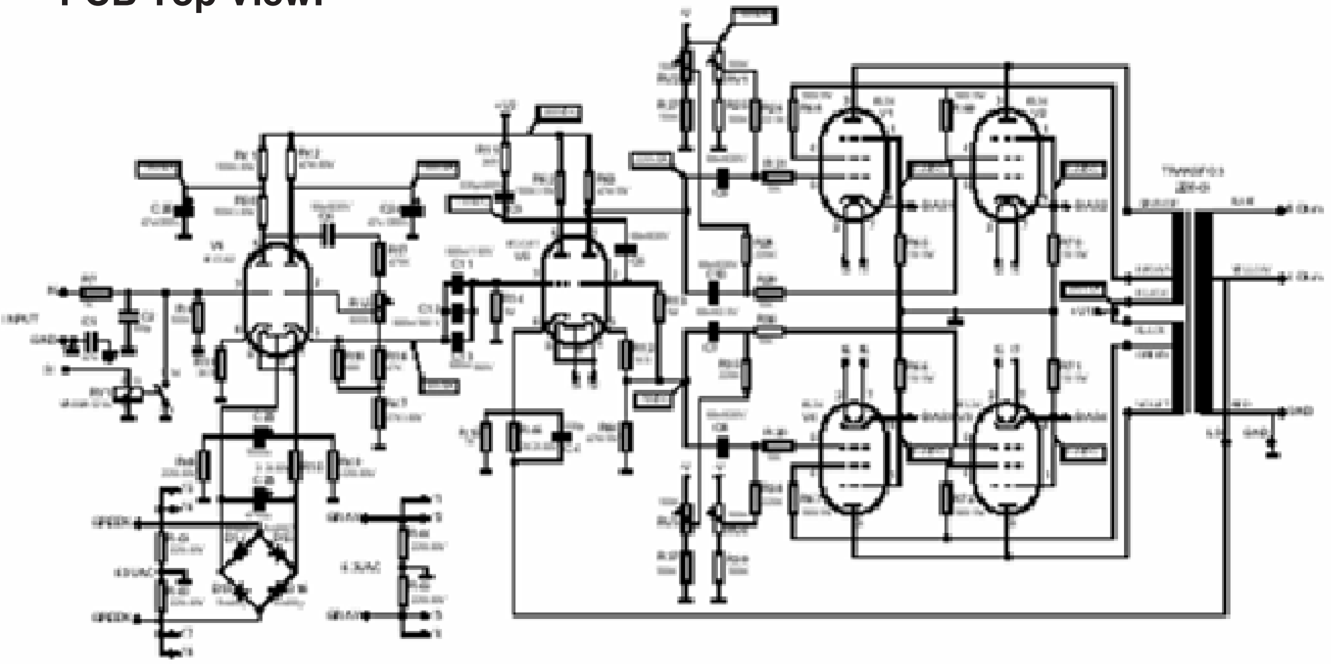
Specifications

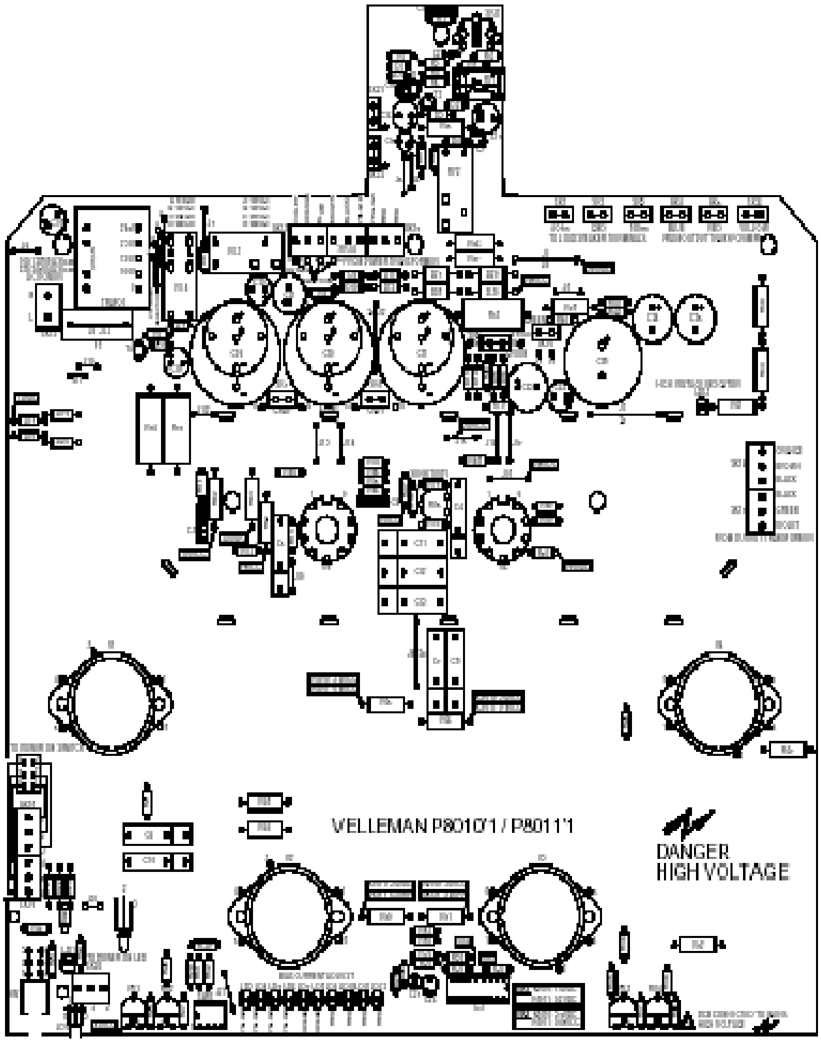
1. Valves : 4 x EL34, 1 x ECC81, 1x ECC82
2. Output power : 90Wrms at 4 or 8ohm
3. Bandwidth : 2Hz to 125KHz (-3dB/1W)
4. Harmonic distortion : 0,1% at 1W/1KHz
5. Signal/noise ratio : 104dB (A-weighted)
6. Input sensitivity : 1Vrms minimum (adjustabl
7. Stand-by power consumption : 60W
8. Max. power consumption : 230W
9. Assembled module dimensions : 320 x 345 x 130mm (12.6" x 13.6" x 5.0")

Circuit Diagram:



PCB Top View:


INPUT
SPEEDK
GND
TRANSFO
4 OHM
8 OHM
GND
V1
V2
BIAS1
BIAS2
BIAS3
BIAS4


VELLEMAN P8010'1 / P8011'1
DANGER
HIGH VOLTAGE

28- VALVE CONTROL AMPLIFIER

دائرة تحكم عن طريق الصمامات

يمكن ان تكون جهازك الصوتي الخاص بواسطة هذا الكارت المنفرد التصميم، الذي يجمع بين التصميم الفريد والشكل الجميل والقدرة العالية علي اعطاء اعلي النتائج. الجهد المستخدم ٢٢٠ فولت (التيار المنزلي)، و القدرة المستهلكة ١٦ وات.

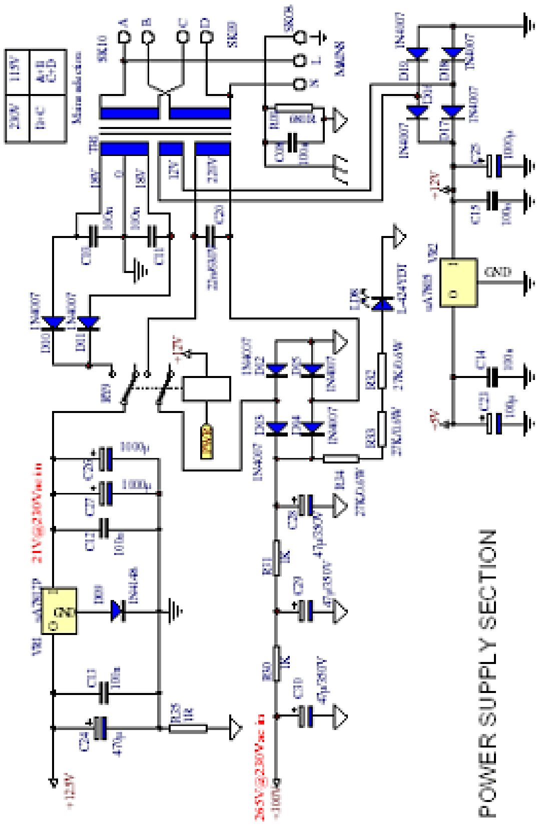
Features

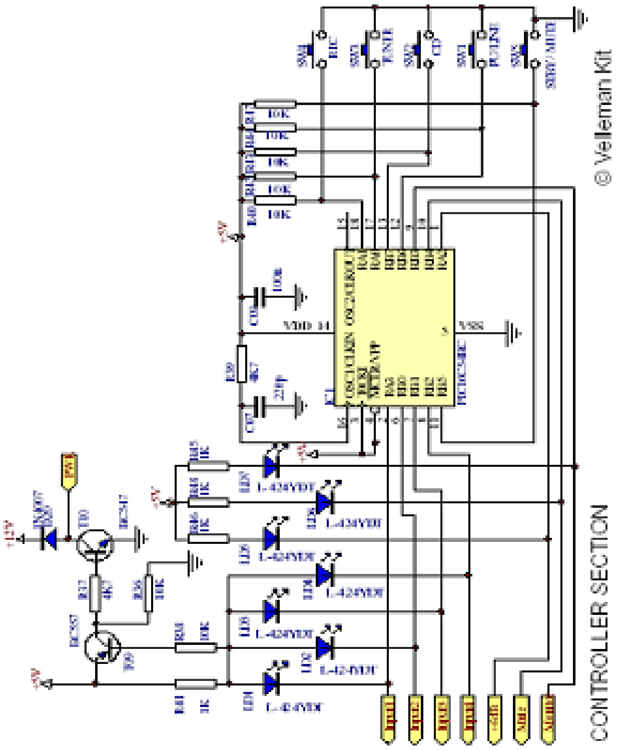
1. No compromise high-end design
2. 4 inputs
3. Exclusive, high finish, solid aluminum enclosure
4. High quality ALPS volume potentiometer
5. Full valve design
6. Auto muting (warm up) at power on
7. Highly reliable reed relay input selection
8. Separate left and right input section
9. Programmable level adjustment : +6dB for each input
10. Regulated DC filament supply
11. Output mute function
12. Switchable monitor output (for tape, CDR, MD,...)

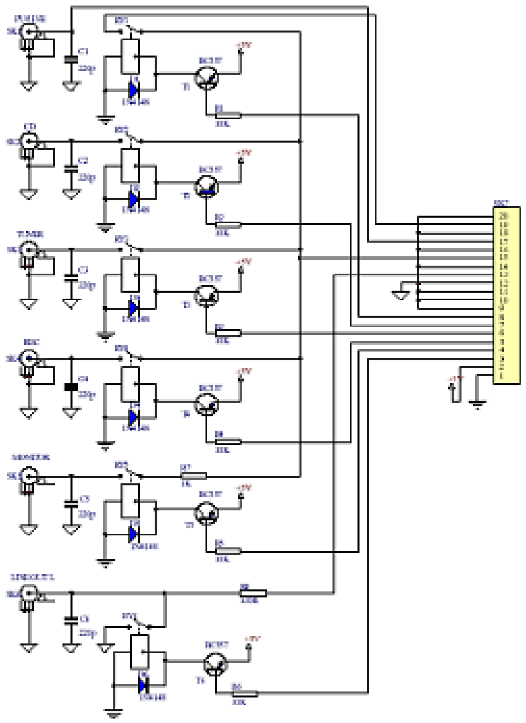
Specifications

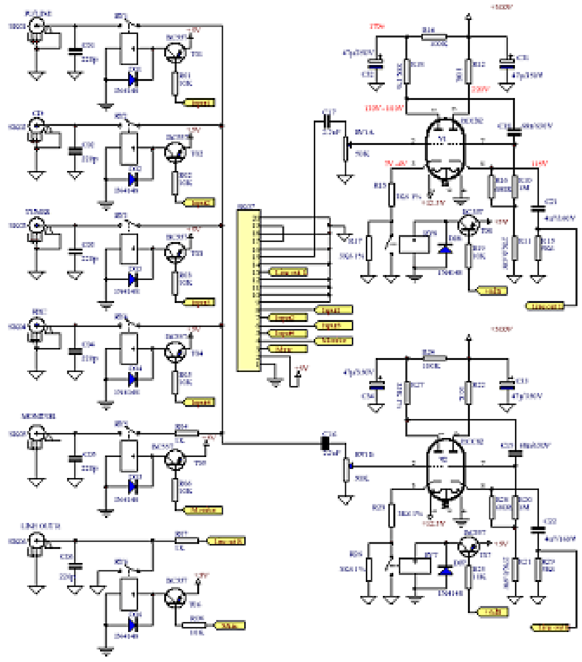
1. Input sensitivity for 0dB (0.775Vrms) out : approx. 200mV / 50Kohm
2. Maximum output level : 35Vpp
3. Output load impedance : 10K or higher
4. Signal to noise ratio (A-weighted ref. 0dB out) : 100dB
5. Total harmonic distortion : <0.04% @1KHz / 47K load
6. Gain : x2 or x4(+ 6dB on)
7. Frequency response :
    * 7Hz to 150KHz (-3dB) @ x2 gain
    * 18Hz to 55KHz within 0.3dB
8. Channel separation : 85dB @ 0dB in
9. Input cross talk : < -100dB @ 0dB in
10. AC power : 115Vac (100V to 120V) or 230Vac (220V to 240V)
11. Consumption : 16W max.
12. Dimensions : 290 x 165 x 68mm (11.4" x 6.5" x 2.7")
13. Weight (net) : 2.7Kg (6lb)

Circuit Diagram:

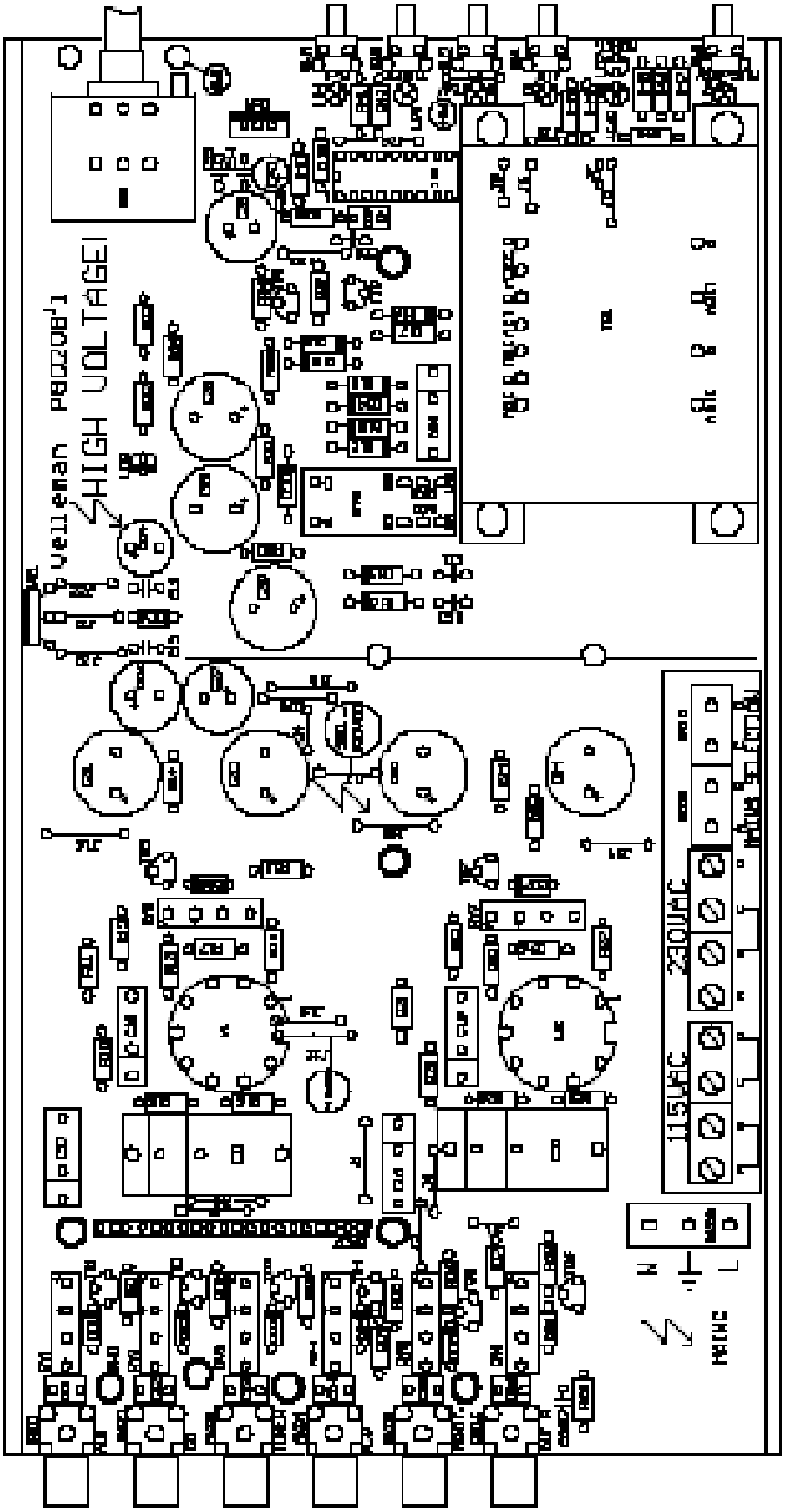








PCB Top View:



29- HIGH-END CONTROL AMPLIFIER دائرة مكبر ذات تحكم في الخرج

يمكن ان تكون جهازك الصوتي الخاص بواسطة هذا الكارت المنفرد التصميم، الذي يجمع بين التصميم الفريد والشكل الجميل والقدرة العالية علي اعطاء اعلي النتائج، هذا بالاضافة الي صغر حجم الدائة

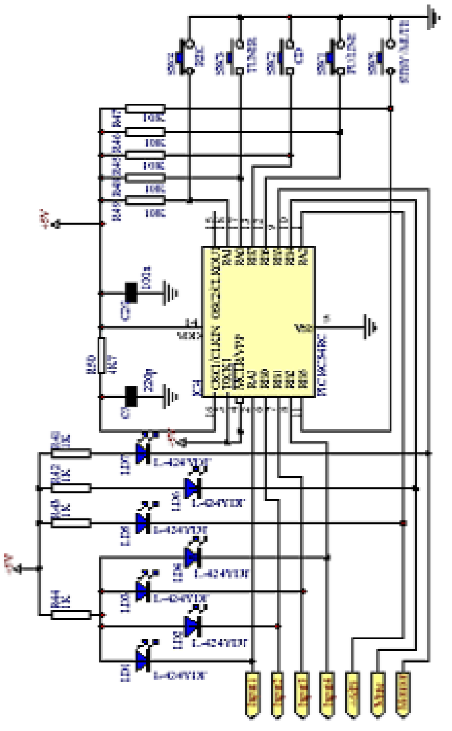
Features

1. No compromise high-end design
2. 4 inputs
3. Exclusive, high finish, solid aluminium enclosure
4. High quality ALPS volume potentiometer
5. Audio grade selected op-amps
6. Capacitor-less output coupling
7. Highly reliable reed relay input selection
8. Separate left and right input section
9. Programmable level adjustment : +6dB for each input
10. Headphones output
11. Output mute function (except phones)
12. Phono RIAA input section
13. Phono input can be configured as line input
14. Switchable monitor output (for tape, CDR, MD,...)

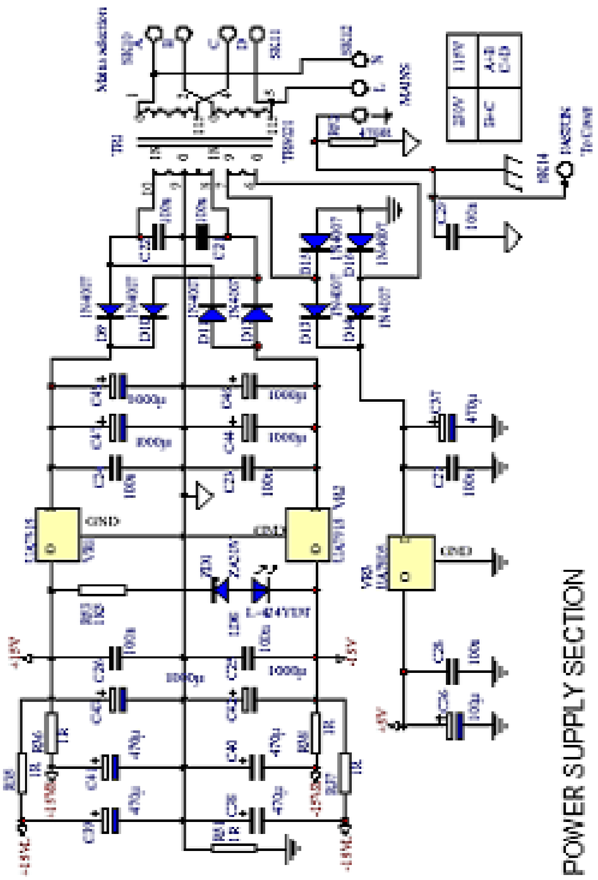
Specifications

1. Input sensitivity for 0dB (0.775Vrms) out :
    - * PHONO : 3mV / 47Kohm
    - * LINE : 200mV / 50Kohm
2. Maximum output level : 26Vpp
3. Signal to noise ratio (A-weighted ref. 0dB out) :
    - * LINE : >105dB
    - * PHONO : 83dB
4. Total harmonic distortion : 0.003% @1KHz
5. Gain : x2 or x4 (+ 6dB on)
6. Frequency response :
    - * 4Hz to 500KHz (-3dB) @ x2 gain
    - * 10Hz to 100KHz within 0.3dB
7. Channel separation : 90dB @ 0dB in
8. Input cross talk : < -100dB @ 0dB in
9. Headphones output : 250mW max. @ 32ohms
10. AC power : 115Vac (100V to 120V) or 230Vac (220V to 240V)
11. Consumption : 6W max.
12. Dimensions : 290 x 165 x 68mm (11.4" x 6.5" x 2.7")
13. Weight (net) : 2.2Kg (4.8Lbs)

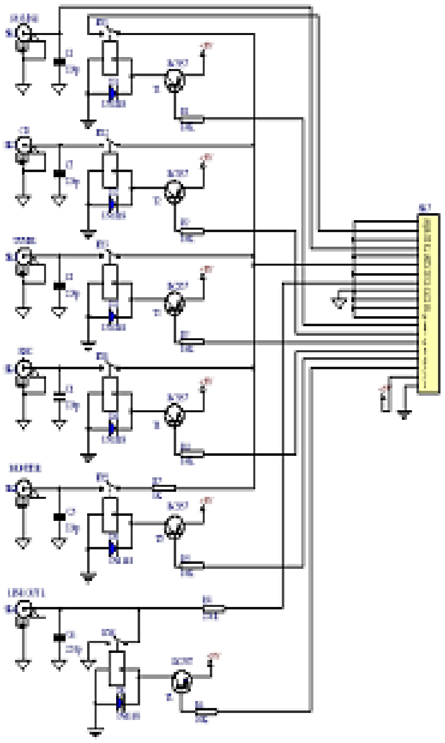
Circuit Diagram:

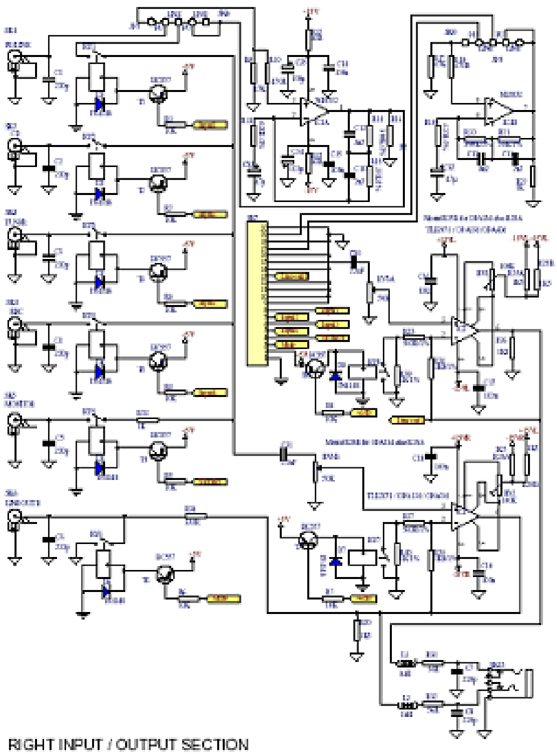


CONTROLLER SECTION



POWER SUPPLY SECTION

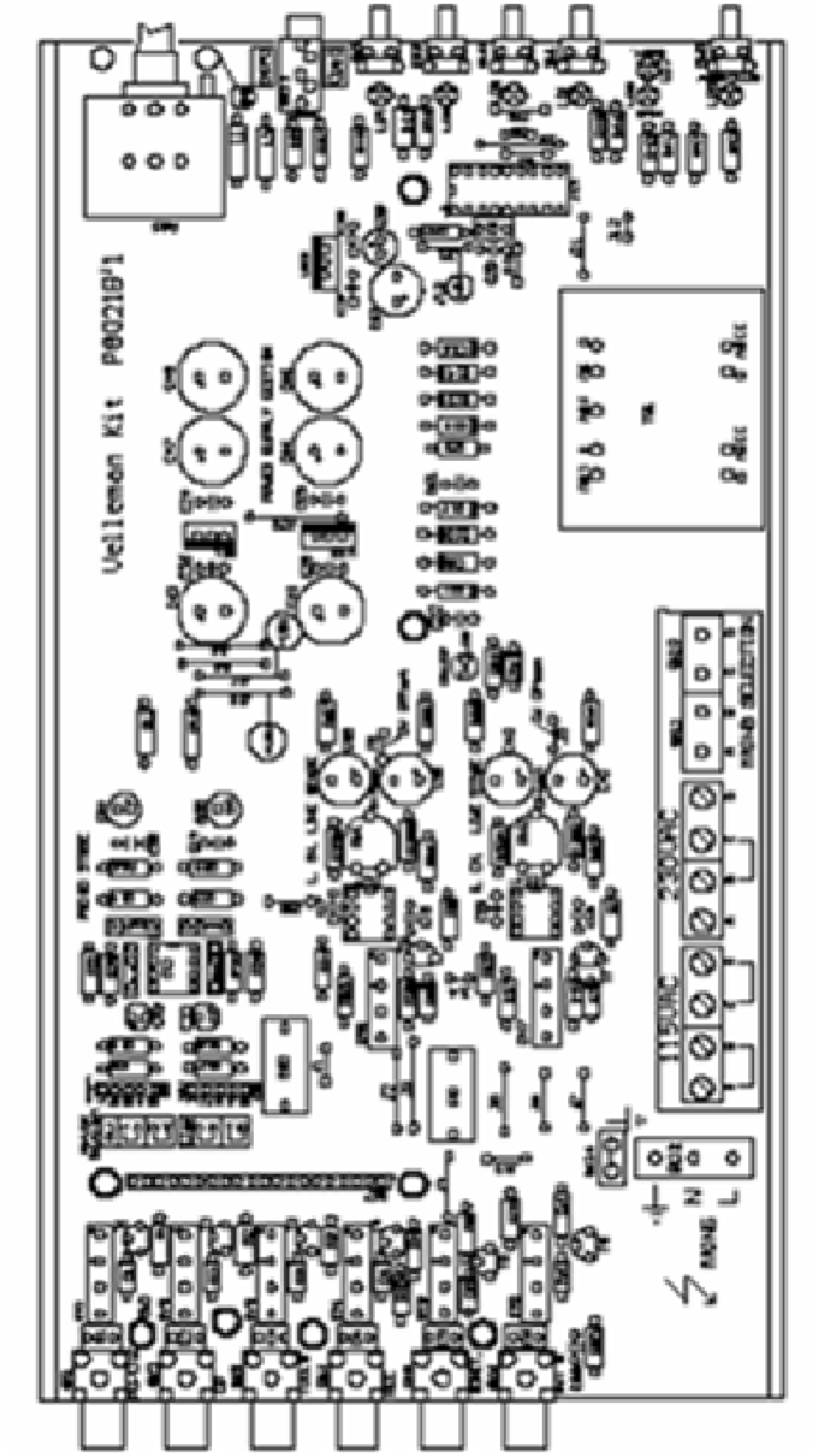




RIGHT INPUT / OUTPUT SECTION
AMPLIFIER SECTION

© Velleman Kit

PCB Top View:



30- PASSIVE PREAMP WITH RF REMOTE CONTROLLER

دائرة مكبر ابتدائي مزودة بريموت تحكم (عن طريق موجات الراديو)

تتكون الدائرة من قسمين، القسم الاول هو دائرة مكبر ابتدائي يتيح لك تكبير مستوي الصوت والتحكم في مستواه، والقسم الثاني دائرة التحكم التي تتيح لك حرية التحكم عن بعد في الدائرة. الجهد المستخدم ١٢ فولت، التيار المستخدم ٣٠٠ ميلي امبير

Features

1. Two stereo level RCA inputs
2. One stereo RCA output to power amp
3. Motor controlled volume control
4. RF remote control for all functions
5. The remote does not need to 'see' the receiver
6. Self-learning code
7. Range : up to 15m (50ft) depending on environment
8. Manual operation possible
9. Gold plated RCA connectors
10. Relay controlled input selection
11. Totally passive

Specifications

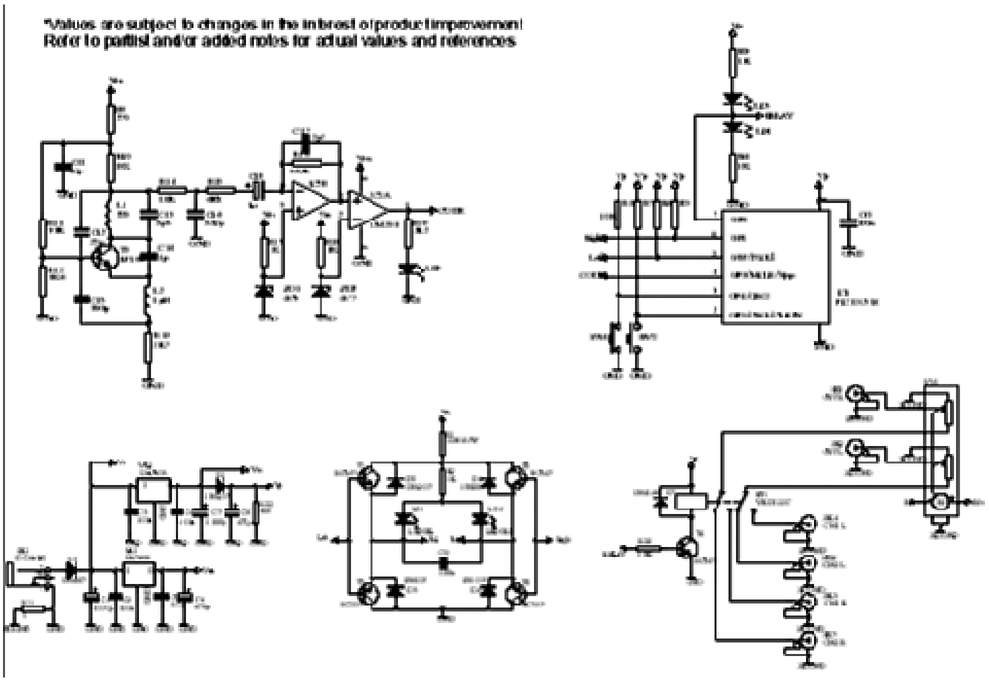
Preamp :

* Inputs : 2 (line level)
* Output : 1 (line level)
* Input impedance : 5Kohm
* Output impedance : < 2.5Kohm
* Volume control speed : 15s typ. (0 to max. volume)
* Dimensions : 235 x 165 x 47mm (9.3" x 6.5" x 1.9")
* Power supply : 12VDC / 300mA

Remote control :

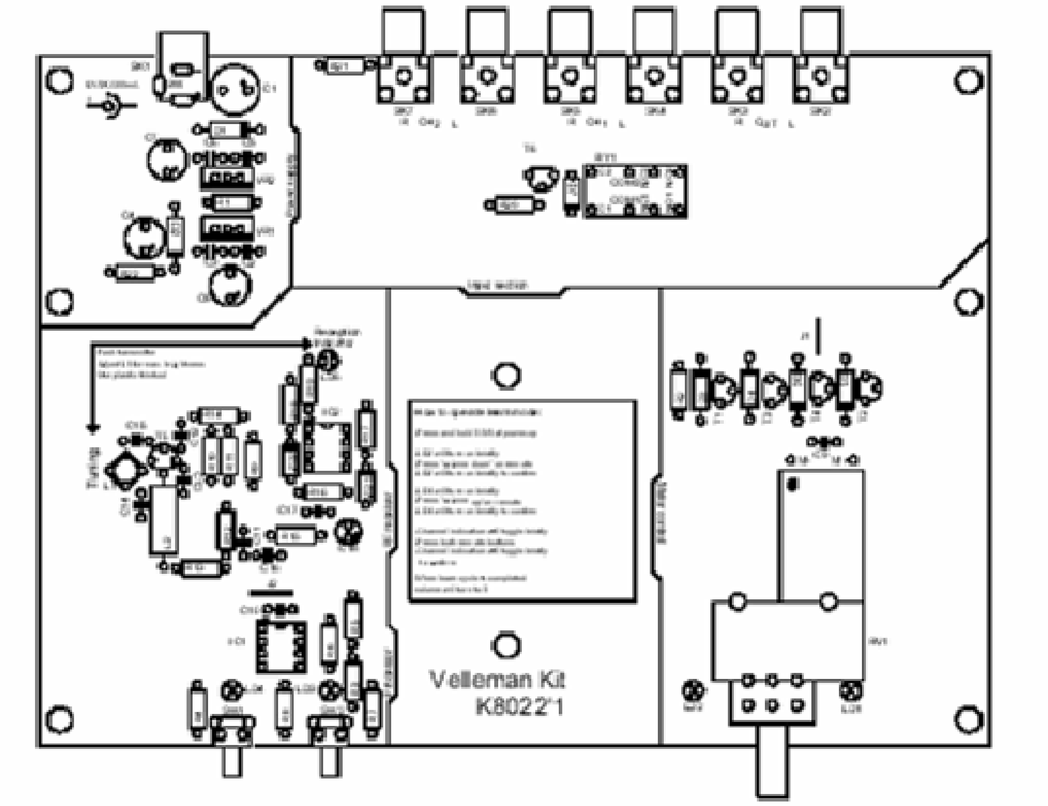
* 433MHz operation
* Approved design (report BLC/96-0452 according to I-ETS 300 220)
* Key chain-style
* Battery (not included) : 12V type **{** HYPERLINK "http://www.velleman.be/product.asp?id=17377" **}**, **{** HYPERLINK "http://www.velleman.be/product.asp?id=7407" **}**, ...
* Dimensions : 39 x 15 x 57mm (1.5" x 0.6" x 2.3")

Circuit Diagram:



*Values are subject to changes in the interest of product improvement
Refer to partlist and/or added notes for actual values and references

PCB Top View:



31- ELECTRONIC RECORD/PLAYBACK MODULE

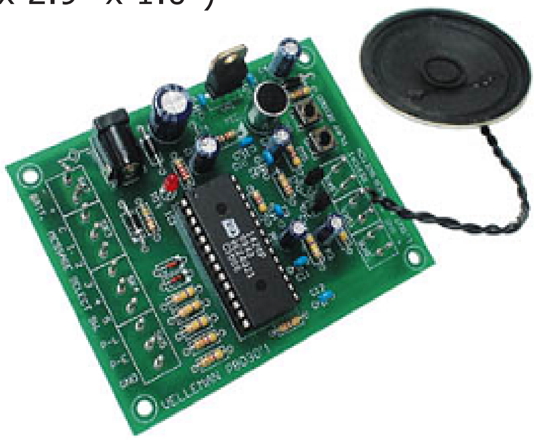
كارت تسجيل واعادة التسجيل

يمكنك ان تسجل اي صوت لمدة ٢٠ ثانية مع امكانية اعادة تشغيل الصوت المسجل. الجهد المستخدم ٨ ـ١٨ فولت، والقدرة ١٢ ميلي وات.

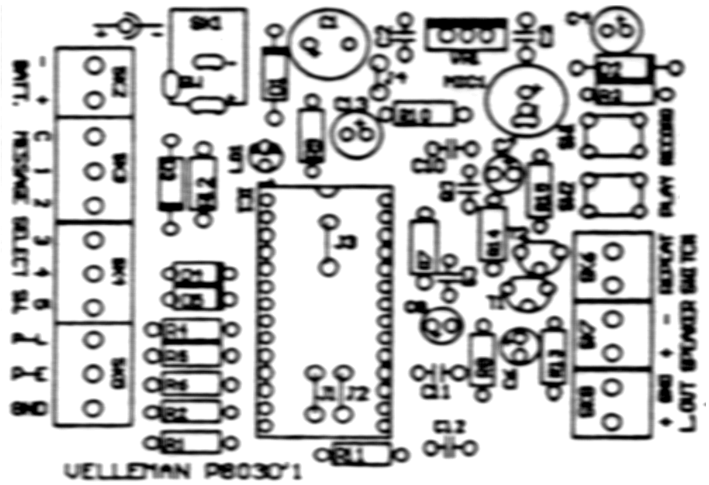
High-quality, natural voice/audio reproduction. Can be used to greet visitors, play pranks, warn burglars,… EEPROM technology with 100-year message retention. Microphone included. Up to 20 seconds of recording time per module. No memory loss in case of power failure. Loudspeaker and line-out included. 2 Play modes : Push once to play message / Play message until button is released. Add an optional rotary switch for message selection.

Specifications:

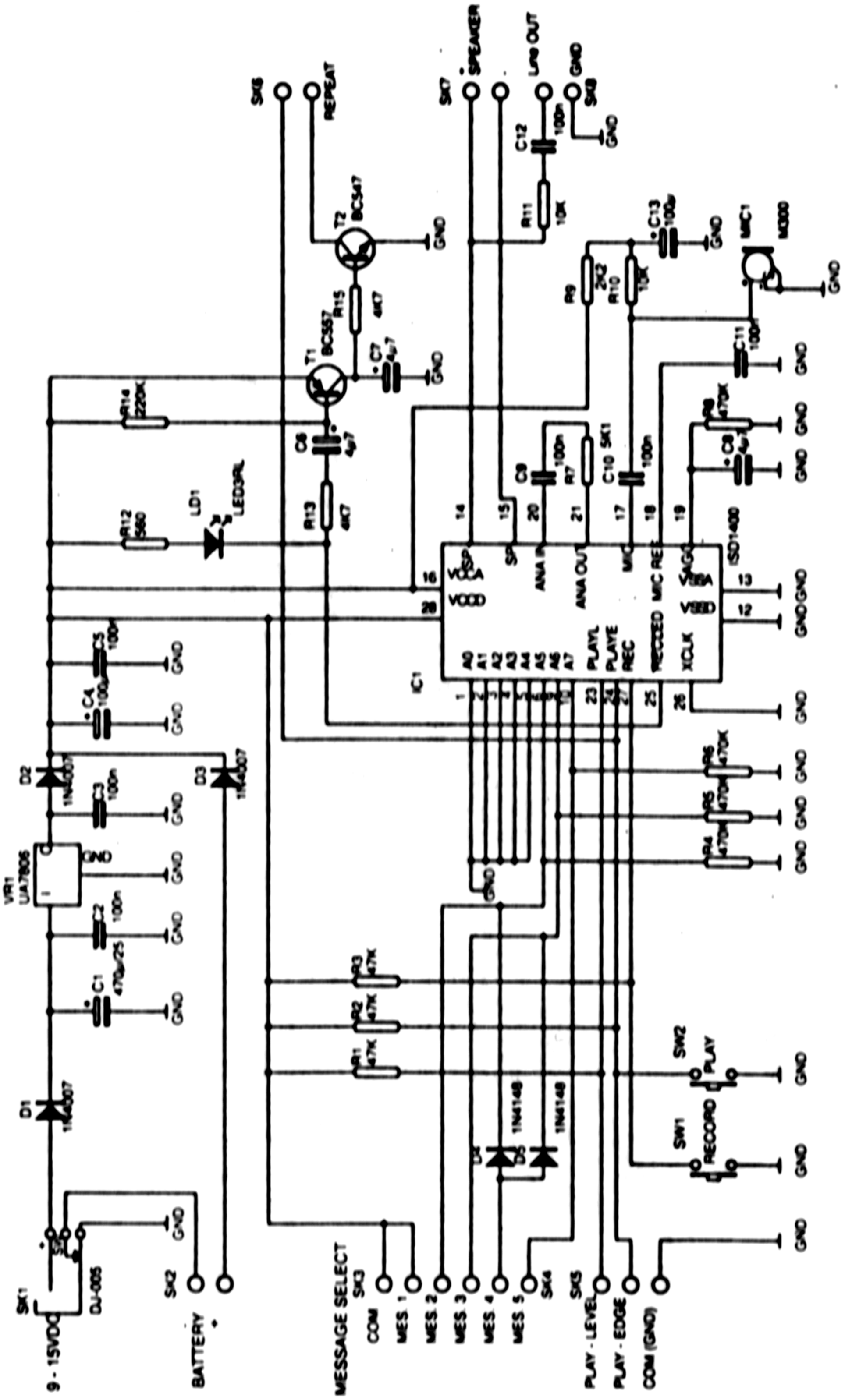
1. 8 ~ 16 ohm, 12mW speaker output
2. power supply : 8 - 18Vdc, or 6V battery (4 x AA of AAA)
3. power consumption :
   - * DC power supply : 4mA in standby, max 100mA when playback
   - * Battery operated : 20µA in standby, max 100mA when playback
4. sampling frequency : 6.4KHz
5. dimensions : 94 x 73 x 25mm (3.7" x 2.9" x 1.0")



PCB Top View:



Circuit Diagram:



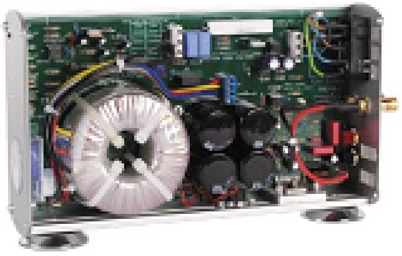
32- HIGH-END MONO MOSFET POWER AMPLIFIER

دائرة مكبر عالي القدرة لاشارة صوت احادية

يجب مراعاة ربط الدائرة باشارة الدخل باسلاك قصيرة، كما ان الدائرة تعمل اليا عندما تصلها اشارة الدخل اي انها لا تحتاج لجهد تشغيل خارجي واقصي قدرة ٩٠ وات عند استخدام سماعات ٤٠ اوم.

Features

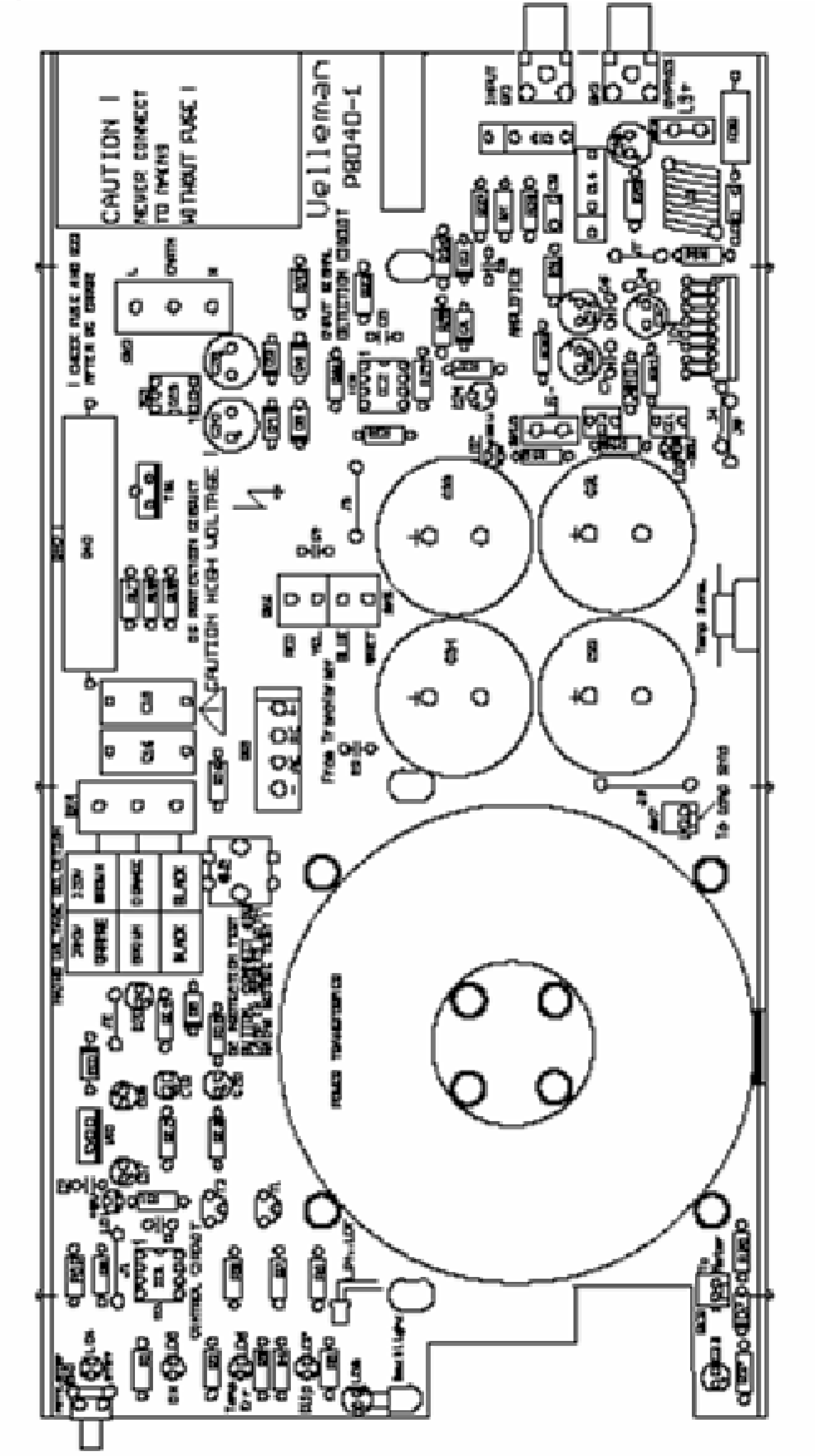
- No compromise high-end design
- Ideal to place next to the speaker (short wires to the speaker)
- Auto-power on possibility when input signal is sensed
- Auto-standby function when no input signal is sensed
- Exclusive, high finish, solid aluminium enclosure
- High quality D-MOS IC output stage
- Total of 40.000uF power supply capacitors
- Relay-less speaker DC protection
- Real Clipping distortion indication
- Power output level indication with backlight
- Bypass output to drive bi-wired speakers using separate amplifiers
- Double overheating protection with LED indication
- High grade speaker and input connections
- Overload protection



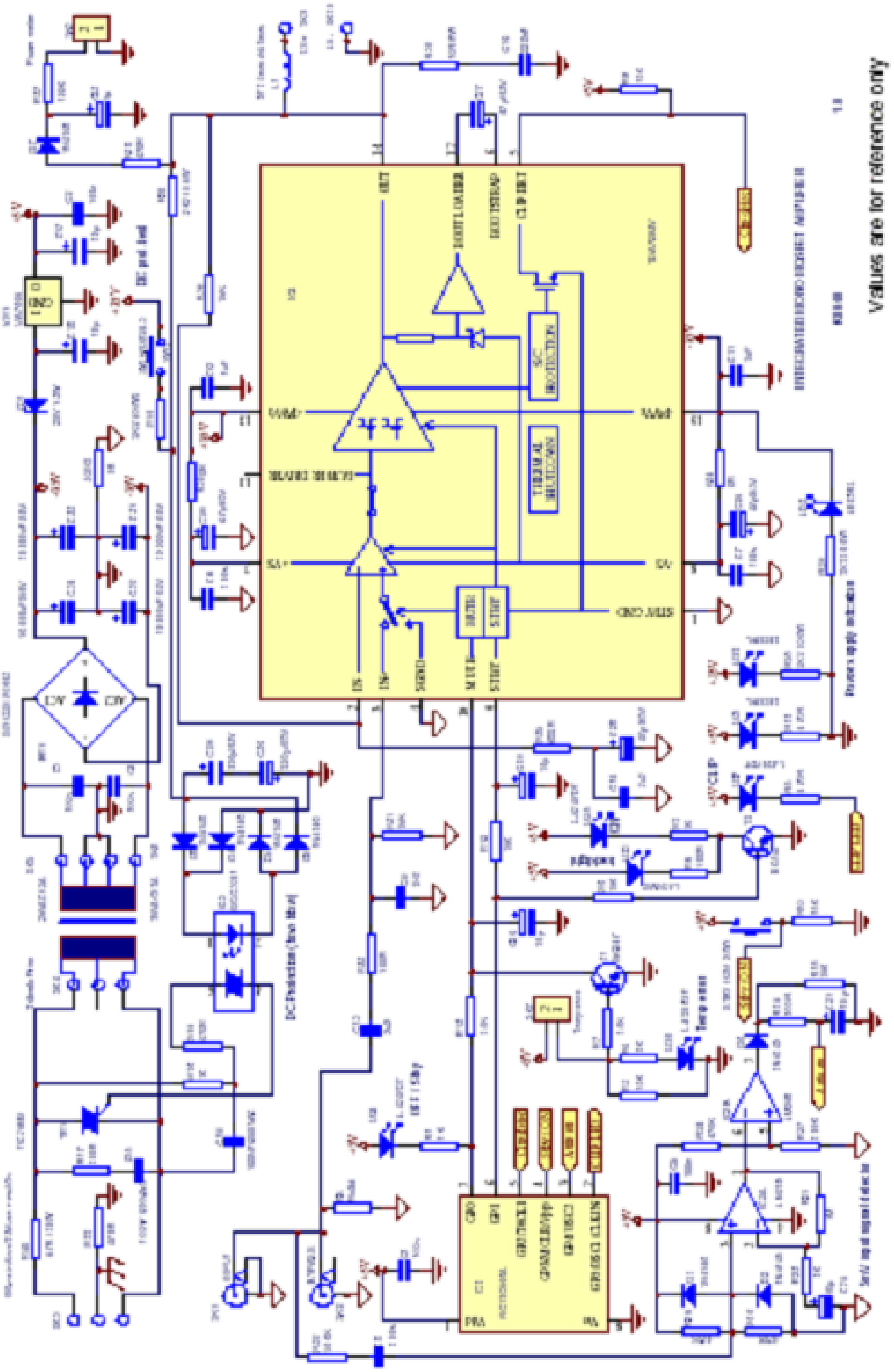
Specifications

- Input :
  - input sensitivity for maximum output : 0dBm (= 0.775Vrms)
  - input impedance : 15Kohm
  - minimum auto switch on voltage : 5mVrms
- Output :
  - maximum RMS output power 4ohm : 90W
  - maximum RMS output power 8ohm : 70W
  - dynamic RMS output power in 4ohm : 125W
  - minimum load impedance : 4 ohm
  - damping factor (ref. 8ohm 100Hz) : > 1000
- Audio :
  - signal-to-noise ratio (A-weighted ref. max. out) : >105dB
  - total harmonic distortion : 0.003% @ 1KHz ref 1W
  - frequency response : 9Hz to 120KHz (-3dB) in 50W
- Power Requirements : depends on version
  - AC power : 115Vac (110V to 120V) or 230Vac (220V to 240V)
  - consumption : 100W max.
  - dimensions : 290 x 165 x 68mm (11.4" x 6.5" x 2.7")
  - weight (net) : 3.4Kg (7.5Lbs)

PCB Top View:


CAUTION !
NEVER CONNECT
TO MAINS
WITHOUT FUSE !
Velleman
P8040-1
CAUTION HIGH VOLTAGE

Circuit Diagram:



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Audio\Hi Fi Applications

1- IC-Radio HF-MF-LF No. B013 دائرة راديو

دائرة بسيطة لراديو يمكنه كل من استقبال الترددات المرتفعة والمتوسطة والطويلة. تعمل الدائرة ببطارية ٩ فولت و أقصى قدرة لها ١ وات. لابد من التأكد من وضع المكونات بطريقة صحيحة حيث أن المكثف الكيميائي له طرف سالب و آخر موجب والدايود D له علامة في أحد الأطراف لابد أن توضع في مكانها على الدائرة المطبوعة وكذلك ال IC. وبناء على التردد الذي ترغب في استقباله نقوم بلف الملف حيث تكون عدد لفاته ١٠ للترددات المرتفعة و ٦٤ للترددات المتوسطة و ١١٠ للترددات الطويلة ولا نقوم بلف الملف مباشرة على القطعة الخاصة به ولكن نقوم بلفة علي اسطوانة ورقية ثم نضع القطعة الخاصة بالملف داخل هذه الأسطوانة حيث نقوم باختيار التردد بإدخال و إخراج القطعة المعدنية مع الأسطوانة الورقية. ومن الممكن أن نستخدم أي سلك معزول طوله من ٢-٢٠ متر كهوائي Antenna وكلما زاد طول الهوائي كلما كان الاستقبال أفضل.

An easy to mount radio with loudspeaker. It is possible to receive high, medium or long frequency. Operating mode: single-circuit. For 9V. Output: max. 1 Watt. Excellent sound.

Please make sure that the components will be built in correctly. As far as the electrolytic capacitors are concerned, positive and negative must be observed. The diode "D" has a ring on one side which has to coincide with the assembly print. The IC has an indent on one side which also has to correspond to the assembly print. Depending on the frequency range you want to receive, a coil has to be wind on the enclosed ferrite rod.

For high frequency approx. 10 turns, for medium frequency approx. 64 turns and for long frequency approx. 110 turns.

Do not wind the coil directly on the ferrite rod, but on a paperboard roll and insert the ferrite rod into this roll. The receiver will be adjusted by pulling out or pushing in the ferrite rod into the coil.

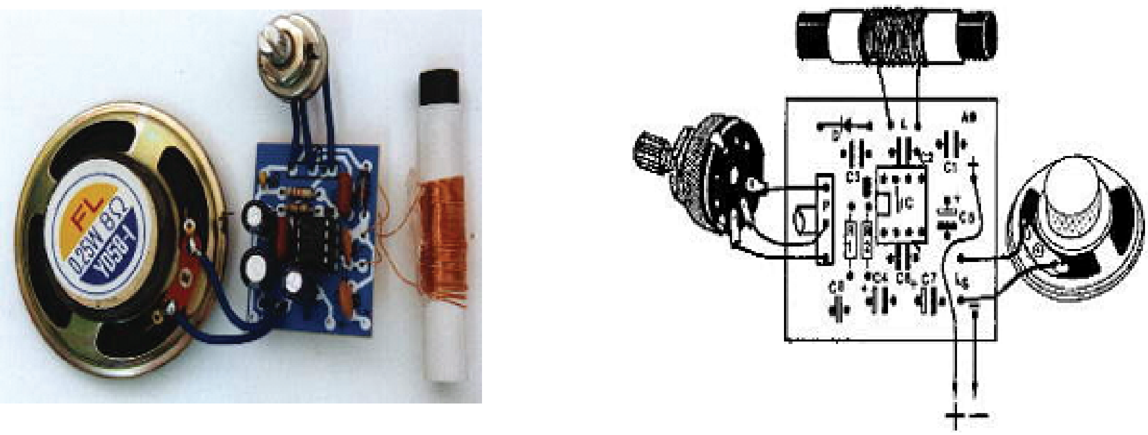
It is only possible to wind one coil each time. The ends of wire should be rubbed with emery paper in order to remove the enameled cover, then they have to be tinned and connected with the board.

Now the antenna has to be connected. For this purpose use any insulated wire, approx. 2...20 meters long, and extend it in the room or outside as wide as possible and connect the end with the board according to the drawing.

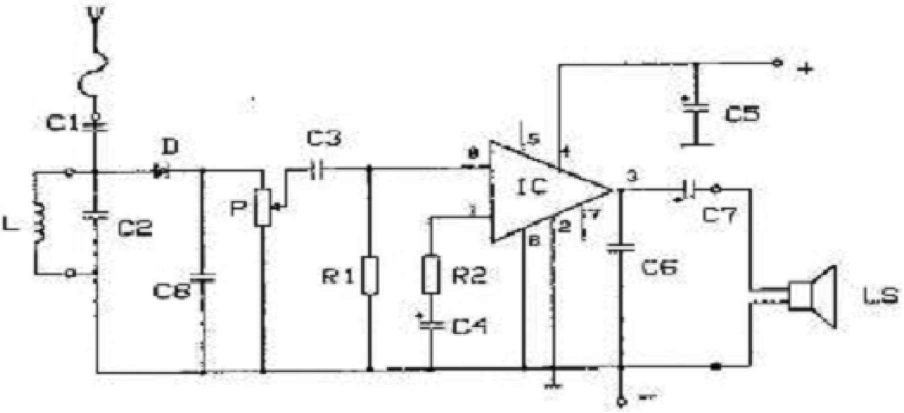
In case you intend to extend the antenna in the open, it is absolutely necessary to observe the lightening protection regulations! Please ask your electrician! The more the antenna wire has been extended, the better will be the reception.

If you have an antenna cable connection in your house, you may also operate this radio at the antenna cable connection provided radio programs are fed, too. Then connect the antenna input of the radio to the internal conductor of the coaxial cable connection! As battery we recommend a powerful 9V battery or even better 2 flat batteries of 4.5V connected in series. Adjust the volume with the pot "P".

The loudspeaker will achieve the best sound if it is installed in a case. If it is placed loose on the table, the case as resonance body lacks and sound and volume will be poor. By means of a step switch it is possible to switch the coil over.



LAYOUT AND TOP VIEW

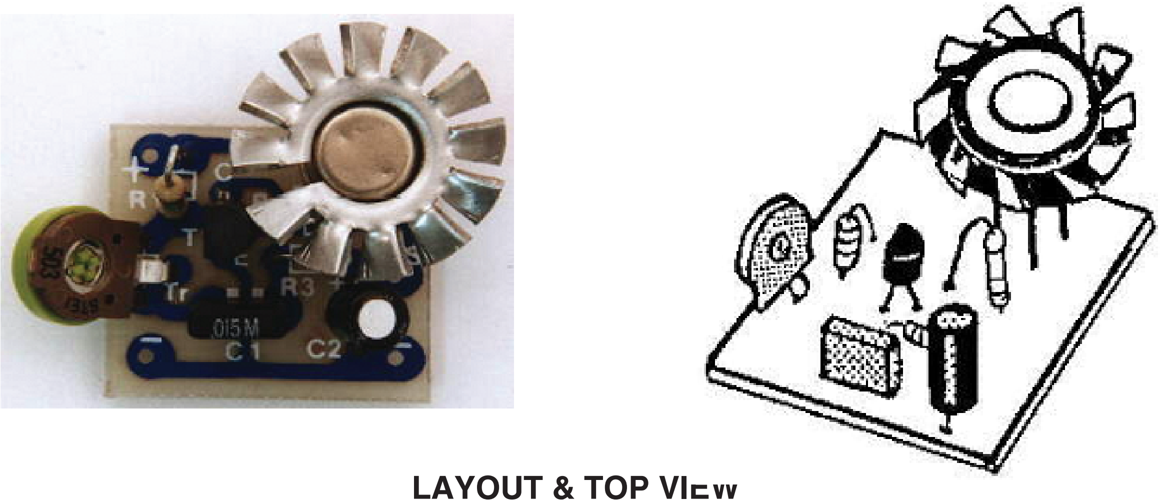


CIRCUIT DIAGRAM

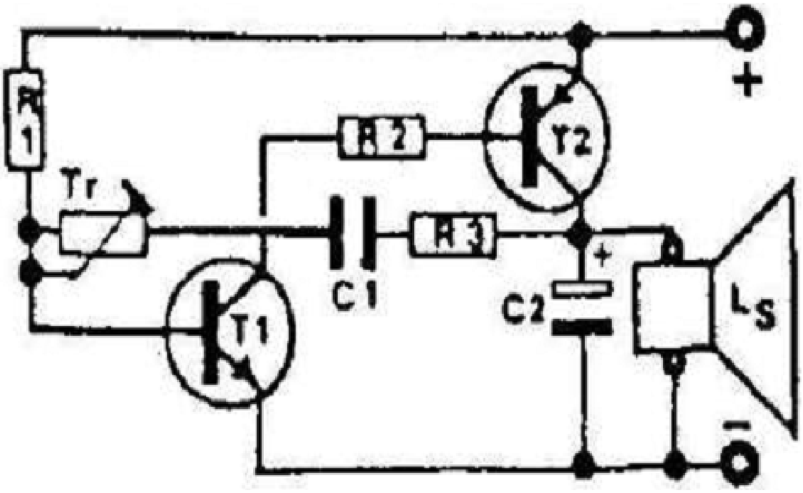
2- Fog Horn, 5W No. B015 دائرة توليد صوت تشويش

هذة الدائرة تقوم بتوليد صوت مرتفع ومزعج يشبه صوت أبواق السفن . وتعمل بجهد دخل من ٤,٥-١٢ فولت وأقصى قدرة لها ٥ وات وتتطلب سماعات ٨ أوم .لابد من تركيب شريحة التبريد على الترانزيستور T2 ولابد أن يوضع ملتصق بها تماما .

generates a deep, noisy sound similar to the fog-horns of ships. Operating voltage: 4,5...12 volts. Power: max. 5W depending on the voltage. For 8 ohms - loudspeakers. It is required to connect a loudspeaker of 8 ohms to operate the fog-horn. Several loudspeakers should be tested by listening to chose that loudspeaker with best fidelity and highest volume level. It is required to use a built-in loudspeaker so that the chassis functions as a sound-board. A loudspeaker with an open chassis results in a poor and too low sound. The attached cooling clip has to be fixed on the transistor T2. The transistor is to be pushed to its edge into the cooling clip and must fit tight in it. The cooling clip may not contact any other metal part but the transistor; it shall also receive sufficient air supply. The requested sound is to be adjusted with the trimmer "Tr". Please pay attention to sufficient power supply! The unit requires a power supply of 300mA, depending on the voltage! If the fog horn doesn't work properly during battery operation (baby- or monocells), the internal resistance of the batteries may be too high. In this case, an electrolytic capacitor 1000µF 12V (between + and -) should be fitted parallel to the voltage connection of the board.



LAYOUT & TOP VIEW



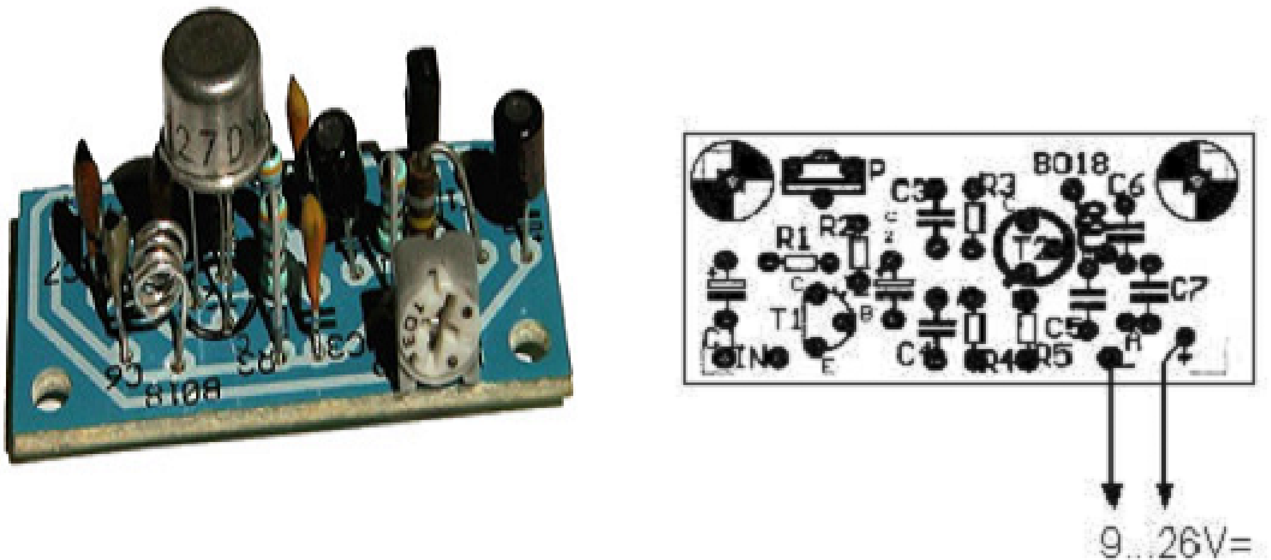
CIRCUIT DIAGRAM

3-FM Oscillator 2W No. B018 دائرة إرسال تعديل ترددى (مذبذب ٢ وات)

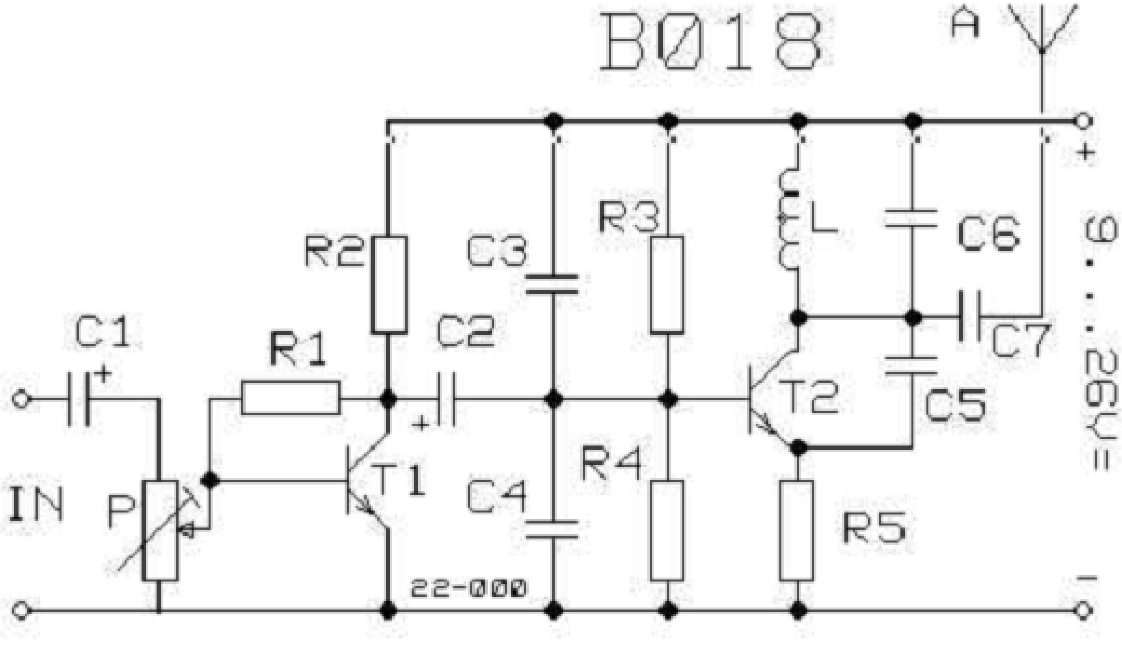
تقوم الدائرة بإنتاج إشارة مترددة بتردد من ٨٠ إلى ١٢٠ ميجاهرتيز . وجهد التشغيل من ٩ إلى ٢٦ فولت وقدرة الدخل ٢ وات وتستخدم هذه الدائرة لإنشاء محطة راديو خاصة وهذا ممنوع في كثير من الدول . والملف المطلوب غير موجود مع الدائرة ويجب لفه.

Adjustable: approx. 80...120 MHz. Operating voltage: 9...26V=, max. 2W input. Suitable for microphone or tape connector. In the EC the device may only be used by licensed radio amateurs. The use as bugging device (mini-spy) or private radio transmitter is prohibited and a punishable offence in many countries (e.g. Europe). Exceptions exist in the USA or international waters. The required coil is not enclosed. It is to be wound by using own material (bare wire). This FM-transmitter has a maximal power of 2 Watt input with approx. 26 Volt=. Although, we recommend when using it as ordinary test oscillator to operate solely with

9V=. In case the capacity is used fully the transistor T2 has to be cooled through a cooling star (the cooling star is not included in the construction set). With operating voltages over 10V it is necessary to include this cooling star! We recommend to operate the transmitter through a battery. In the first place because then it will be impossible that any high frequency is radiated accidentally through the lead to the power supply, and in the second place the transmitter will be "free of humming". With the trimmer potentiometer "P" value of modulation can be adjusted. You may connect a dynamic microphone, a tape recorder or a tone generator at the input of the transmitter. Please use bare and solid wire (silver-plated or tin-plated or copper-bright) with a wire diameter of 0.5...1 mm to manufacture the coil. Wind the wire on a round body with a diameter of 3 mm (e.g. a drill) with 4 turns. Then pull the coil from the wound body and solder the coil with a leg length of approx. 2...4 mm into the board. Bend the wire windings apart so that the windings do not touch each other. Depending on the desired frequency range, you may also make more windings (e.g. 5 windings for transmitter frequencies of < 90 MHz and 3 windings for transmitter frequencies of > 110 MHz. For the fine tuning bend the coil slightly: Pressing together the coil reduces the transmitter frequency (if necessary, insert one coil with 1 more winding = 5 turns). Pulling apart the coil increases the transmitter frequency (or uncoil 1 winding = 3 turns). Please note that the oscillator produces so-called ”harmonic waves”, if no filters are installed in addition. That means: if the basic transmitter frequency is e.g. 90 MHz, it may happen that it has a weak harmonic wave (transmitter frequency > 100 MHz), too. You have to tune-in the transmitter in such a manner that the strongest transmitter frequency is in the desired frequency range (with the signal level measuring set in many receivers). At the antenna output, the radio amateur may connect a bar antenna or an insulated strand (as an antenna) and thus transmit kilometer-long. Length of the bar antenna or strand: approx. 75 cm.



LAYOUT AND TOP VIEW

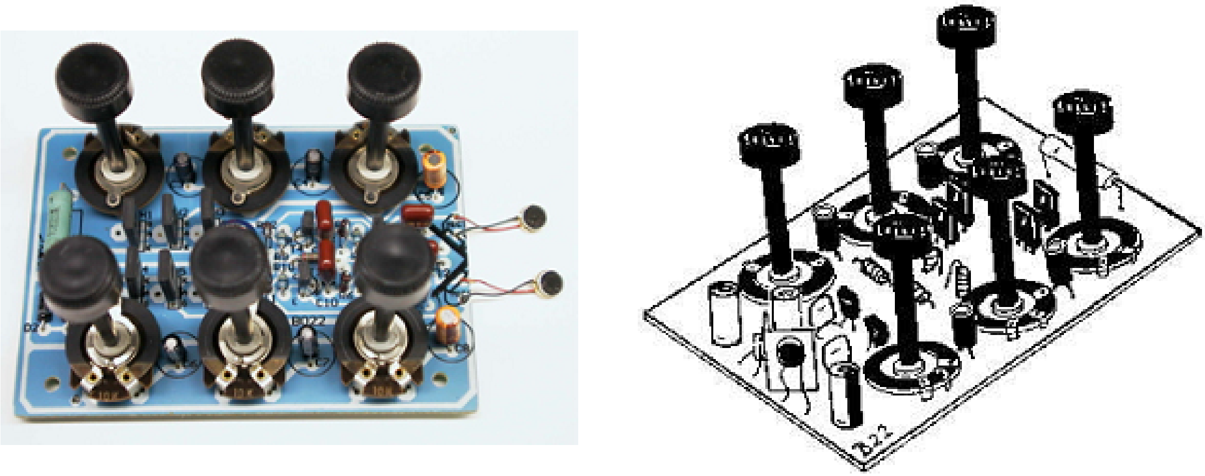


CIRCUIT DIAGRAM

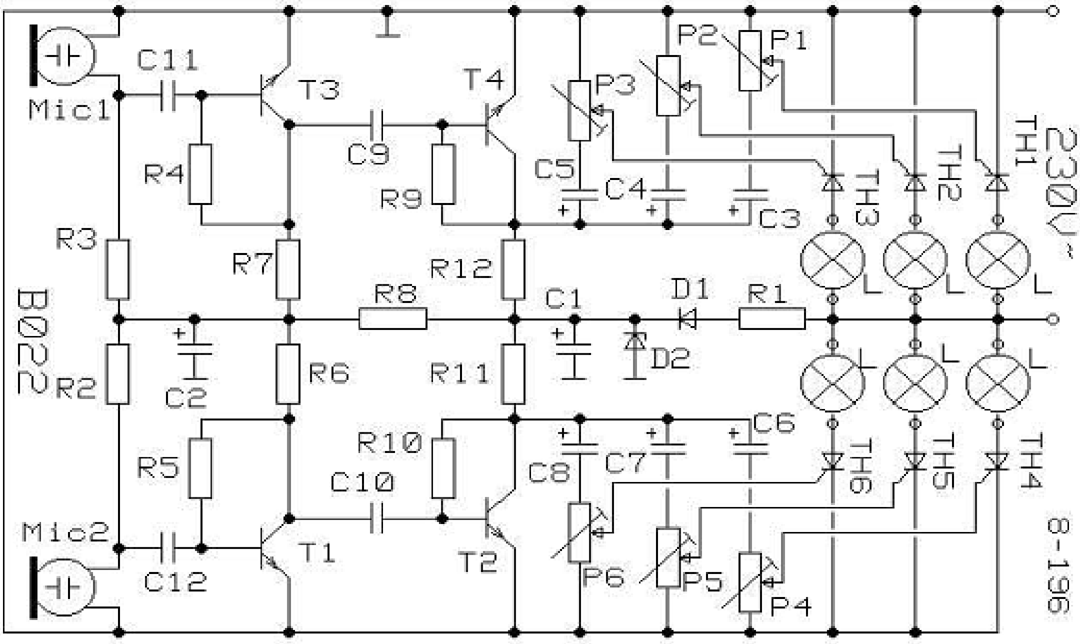
4- 6-channel microphone music light No. B022 دائرة مكسر ٦ قنوات صوت و ضوء

يمكن التحكم في كل قناة على حدة كما يمكن أن نضع لمبة بقدرة قصوى ٥٠٠ وات لكل قناة وهذه الدائرة مناسبة جدا لصالات الديسكو وقاعات الحفلات.

Each channel can be adjusted separately. It is feasible to connect lamps up to max. 500 Watt / 230 Volt ~ per channel. Extremely high input sensitivity! For discotheques, party rooms, etc... This microphone lighting console has 2 microphones at the entries. Therefore, it is not necessary to produce a cable junction to the stereo systems. It is solely possible to connect glow lamps 230 Volt ~, never use quartz or fluorescent lamps, It is advisable to place within the 230V~ current supply a fuse of 10 Ampere! Please observe at any circumstances the VDE-safety regulations! For example, complete touch-protection of all elements carrying current, earthing of all metal lamp sockets, pull-relief of all cables, etc. We recommend to have the mounting before the first operation tested by an expert, Short circuits and overloads will lead to the immediate destruction of the thyristors, In case that during operation one of the channels of the microphone music light won't react, it is necessary to turn down slightly one of the channels which possibly flashes too much.



LAYOUT AND TOP VIEW



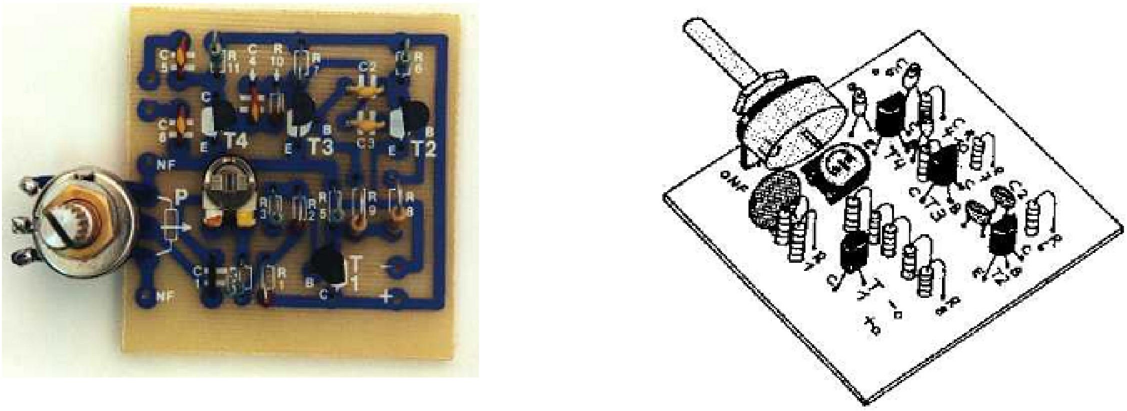
CIRCUIT DIAGRAM

5-Audioscope No. B027 دائرة أوديوسكوب

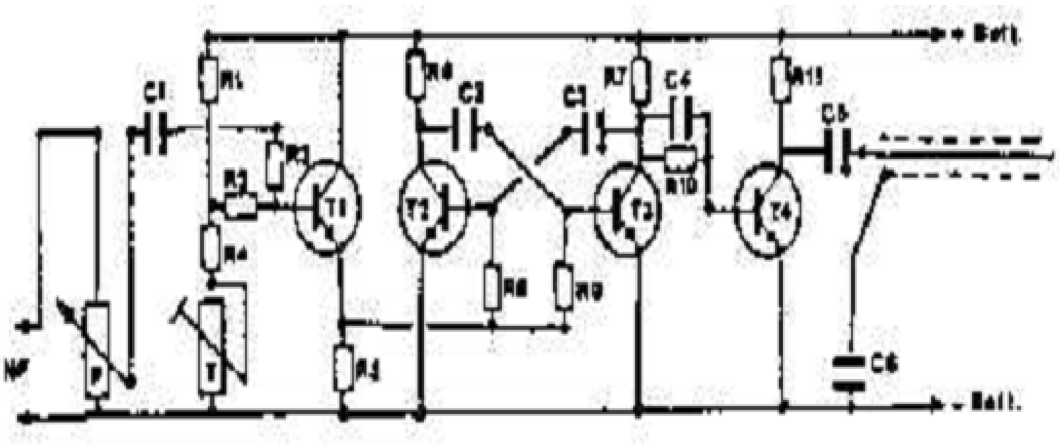
هذه الدائرة تنتج خطوط سوداء عمودية على شاشة التليفزيون والتي تتحرك تبعا للإيقاع الموسيقي مع مراعاة أن الوصلة بين التليفزيون و الأوديوسكوب قصير بقدر الإمكان وان يكون كبل محوري .

produces vertical black bars on the TV-screen, which move according to the rhythm of the music (similar to an oscillator The cable between the television and the audio scope should be as short as possible and screened (coaxial cable). Please carry out the mounting according to the figure, At the AF input is to be

connected the sound source (e.g. radio, tape recorder, etc.) which should be controlled by the audio scope. Balancing is realized through the potentiometer. The television is set on channel 2, 3 or 4, depending on the picture quality. The audio scope should the be regulated through the control T achieving on the viewing screen one or several bars with clear outlines. Attention! Whenever you are regulating with the control T the picture, it is necessary to close the potentiometer P (at the stop at the left side). The most efficient operating voltage between 9..14V could be determined through tests!



LAYOU AND TOP VIEW



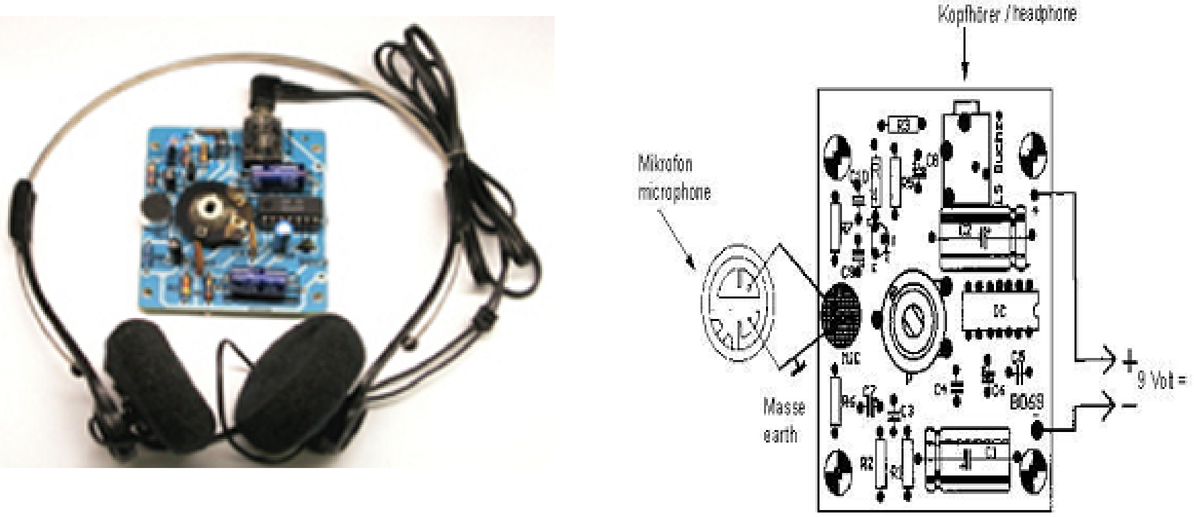
CIRCUIT DIAGRAM

6- Listening-Stethoscope No. B069 دائرة تصنت من خلال الحائط

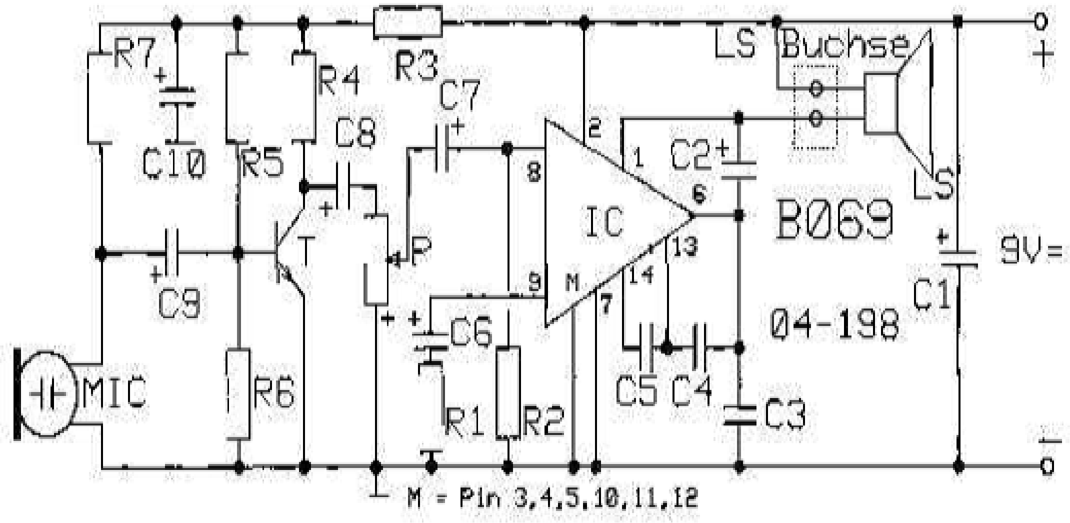
باستخدام هذه الدائرة يمكنك الاستماع من خلال الحوائط الرفيعة والأبواب والنوافذ وهي عبارة عن مكبر شديد الحساسية بميكرفون صغير وسماعات وتستخدم لملاحظة الأطفال أو الحيوانات الأليفة ويمكن التحكم في الصوت من خلال المقاومة المتغيرة.

You are able to listen through thin walls, doors, windows, etc. Highly sensitive preamplifier with microphone capsule and headphone. To be used for observing animals (e.g. mice), as baby-alarm etc. UB: 9V. The IC has to be placed so, that the notches on the case of the IC coincide with the marks on the p.w.b..

Controlling of volume and sensitivity can be achieved with the potentiometer. In case of disturbances like bubbling, humming etc., the p.w.b. has to be placed in a metal case, connecting the case with "earth" (negative pole at the battery). For monitoring babies, animals etc. the p.w.b. may be situated with the microphone in the room wich you want to listen. The microphone is so sensitive that even inferior noises are listened. The cable of the headphone and of the current supply can be extended in any length. The microphone should not be connected through a longer cable with the p.w.b.! If the p.w.b. (printed wiring board) with the microphone capsule cannot be situated directly in the room which you want to listen, the microphone must be fixed with adhesive tape at the most sound conducting window or door. Through a cable (3...4 m) the headphone is connected with the p.w.b. The listening person has to be quite remote from the capsule. In this room should not be any noises because of following reasons: The microphone capsule has to pick up even weak noises coming from the other room. Therefore, turn on the amplifier considerably so that particular inferior noises are recorded. You must consider that the capsule does not distinguish between the sounds in the listened room and the noises in the "control room". That's why the noises in the control room are amplified. Usually, these noises are louder and therefore the listener may hear his own respiratory sounds like listening to a "thundering storm". To prevent this, the person must sit 3...5 m far from the capsule. Therefore, any noises must the omitted because they will surely drown out the noises coming from the listened room and will make it impossible to listen. Besides, it lasts ten minutes till the ear gets accustomed to the weak noises coming from the listened room, after it had suffered from absorbing any ambient noise in the controlled room (the amplifier amplifies anything). Listening will only be achieved using sound conducting materials: windows with one pane, massive doors, plaster walls, wooden floors etc. Listening is not possible through stone walls, sound-insolated walls etc. Advice: The microphone case must be situated directly and firmly on the listened resonance body (e.g. door) because the capsule absorbs the noises generally through the case of the capsule as "sounds in solids". The capsule may not be fixed with e.g. rubber foam! We should inform you that this construction unit is exclusively designed to be used for observing animals (listening mice ducts) or for technical application (e.g. listening water pipes to detect drop-noises) or for listening any noises of bearings in the interior of the engines. The intercepting of conversations of persons and of strange flats etc. is liable to a penalty.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

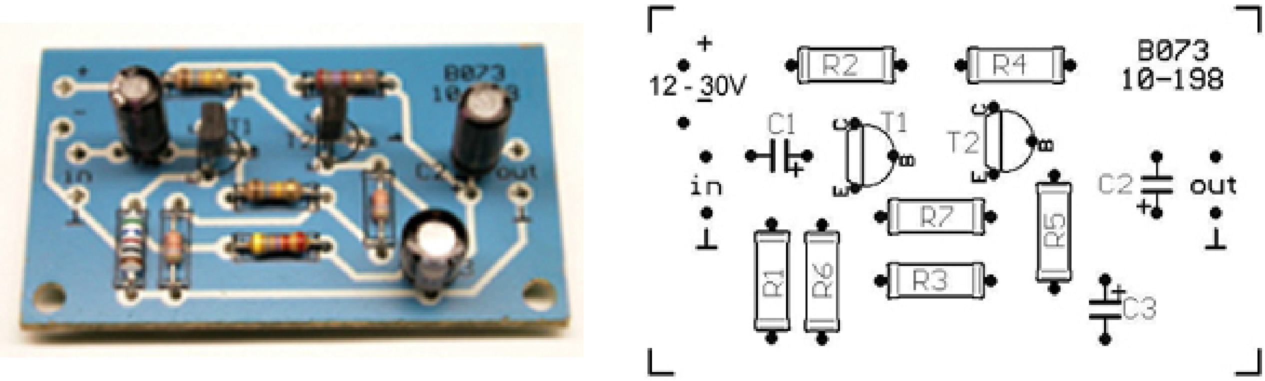
7- universal Pre-Amplifier No. B073 Super Wideband: Approx. 10 Hz...150kHz

دائرة تكبير من ١٠-١٥٠ هيرتز

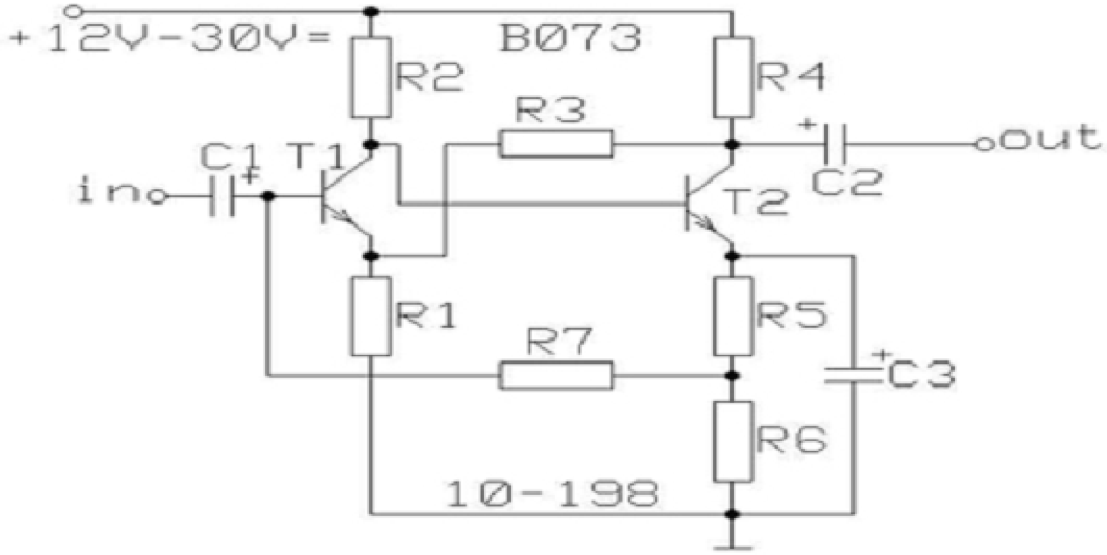
تعمل الدائرة بجهد تشغيل من ١٢ إلى ٣٠ فولت وجهد دخل من ٠,٠٠٢ إلى ٠,٠٢ فولت وجهد خرج من ٠,٢ ال ٢ فولت. وتستخدم كمكبر ابتدائي لمكبرات القدرة العالية ومكبرات الصوت . إذا بدأت الدائرة في التذبذب بسبب عدم تنقية جهد التشغيل يمكننا أن نقوم بتوصيل مكثف 100µF 30V بالتوازي مع ال power supply .

step preamplifier for 12...30V= operating voltage. Input: 2...20mV, output: 200mV...2V.
Application: pre-amplifier for high-power amplifier, headphones-amplifier, etc. This pre-amplifier operates with 12...30V= power supplies. It is not necessary to stabilize the voltage, however, it needs to be filtered. If the pre-amplifier starts

humming or oscillating (continuous tone) due to poorly filtered voltage, you should connect an electrolytic capacitor of approx. 100µF 30V between + and - parallel to the power supply of the pre-amplifier. The connection-wires "input" and "output" of the amplifier must be connected with shielded cables. In any case, the braided screen has to be connected to the junction marked by . If shielded cables are not used, hum-interferences might occur: the amplifier will transmit 50Hz-humming simultaneously with the signal amplified. Signal sources from 2mV to 20mV output voltages may be connected directly, e.g. microphones, etc. The connection of sources with over 20mV output voltage (e.g. record player with crystal-system, etc.) might result in blasting the pre-amplifier and distortions. In this case, a potentiometer should be connected before the input to regulate the input voltage to a lower level. Recommended potentiometers or trimming potentiometers: from 1 k to 100 k. In very rare cases, the pre-amplifier could start oscillating when fed by batteries with a too small internal resistance. In case this happens, an electrolytic capacitor of approx. 100µF 30V has to be connected parallel to the power supply.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

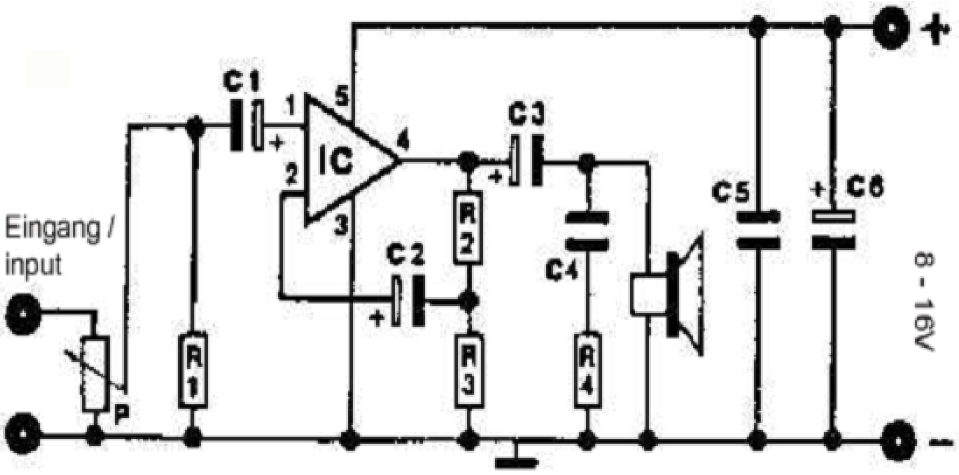
Safety instructions for B073

These operating instructions belong to this product. They contain important instructions for operation and handling. Please keep this in mind when passing the product on to another person. This kit is not intended for persons under 14 years (it has no CE approval as a children's toy). Never expose this kit to high temperatures, strong vibrations or humidity. Setting into operation has to be done by adequate qualified personnel in order to guarantee the safe operation of this product.
The operating voltage may only be drawn from a battery or power supply unit tested for safety. The regulations for prevention of accidents for electrical installations and operating material of the industrial employer's liability insurance association are to be observed in industrial facilities. In schools, training centers and do-it-yourself workshops, the operation of this appliance is to be supervised reliably by trained personnel. Never place the appliance close to combustible or inflammable materials (e.g. curtains).We do not assume any liability for material damage or personal injury caused by non-compliance with the operating instructions and these safety instructions as well as for its consequential damage

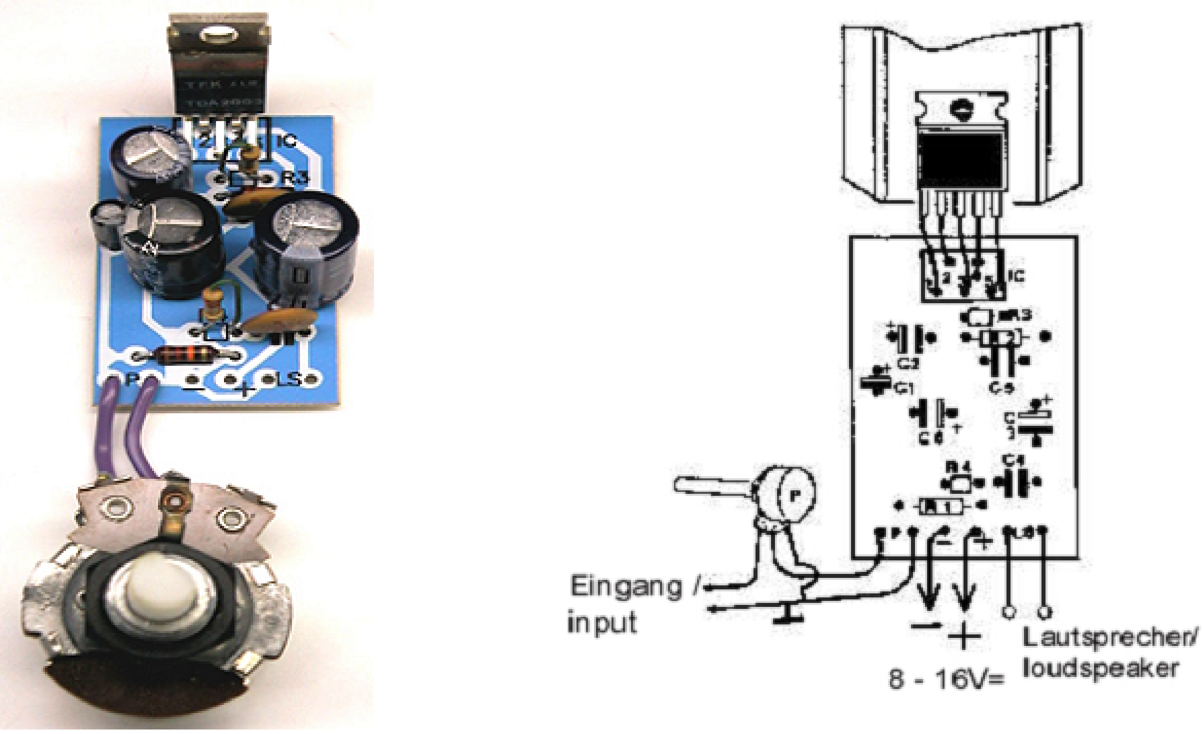
8- Amplifier 12W No. B075 دائرة تكبير ١٢ وات

مكبر هاي فاي ، الخرج من ٤ إلى ١٢ وات بناءا على جهد التشغيل ، جهد التشغيل من ٨ إلى ١٦ فولت ، تستخدم للسماعات من ١,٦ إلى ٨ اوم ، نطاق الترددات من ٤٠ هيرتيز إلي ٢٠ كيلو هيرتيز .

Hi-Fi amplifier, output: 4...12 watts, depends on operating voltage and loudspeaker. Operating voltage: 8...16V. For loudspeakers of 1,6...8 ohms. Frequency range: approx. 40...20.000 Hz. Vi: 50mV.
Required cooling element: approx. 10 x 4 x 2 cm (cooling fan). Please pay attention to the proper assembly of the board: the electrolytic capacitors are to be installed in the appropriate position (+ and -). The IC must be screwed on the cooling unit. The cooling unit must be mounted insulated, as it is electrically connected to the IC. Accordingly, the cooling unit may not be screwed directly on the housing, etc.! The cooling unit could be to small, if the amplifier is continuously operated at max. power output. When the IC "turns off" due to extreme rise in temperature (overheating protection), a larger cooling unit should be used. Signal sources of min. 50mV output voltage (e.g. record players with crystal-system, cassette-players etc.) can be connected to this amplifier.
An increase of the sensitivity to approx. 1mV may be attained by a pre-amplifier (e.g. Kemo-kit no. B073). Upon this, you may also connect microphones. When magnetic-shell record players are to be connected, it is necessary to use an equalizing pre-amplifier (e.g. B074). For stereo operation always use two amplifiers: one for each channel. A sufficiently strong accumulator (car accommodator) is required for operation. Power output of the amplifier:
At 14V with a 4 ohms loudspeaker connected: approx. 6 watts.
At 16V with a 1,6 ohms loudspeaker connected: approx. 12 watts.
At 16V with a 4 ohms loudspeaker connected: approx. 8 watts.
The impedance may be modified by switching several loudspeaker in series or parallel.



CIRCUIT DIAGRAM



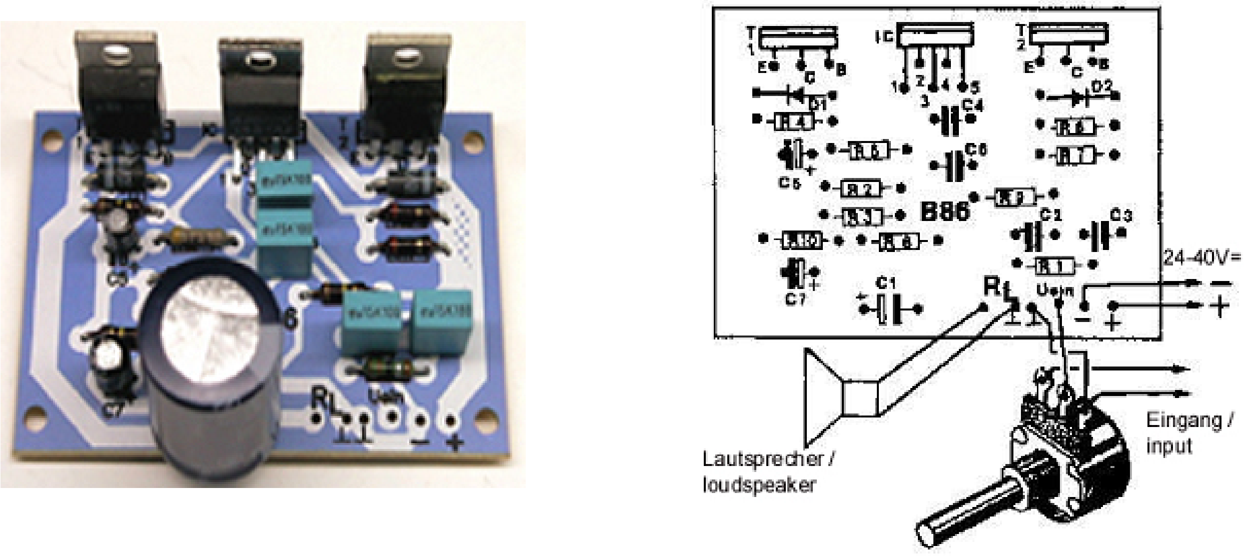
LAYOUT AND TOP VIEW

9- Amplifier 80 Watt No. B086 مكبر ٨٠ وات

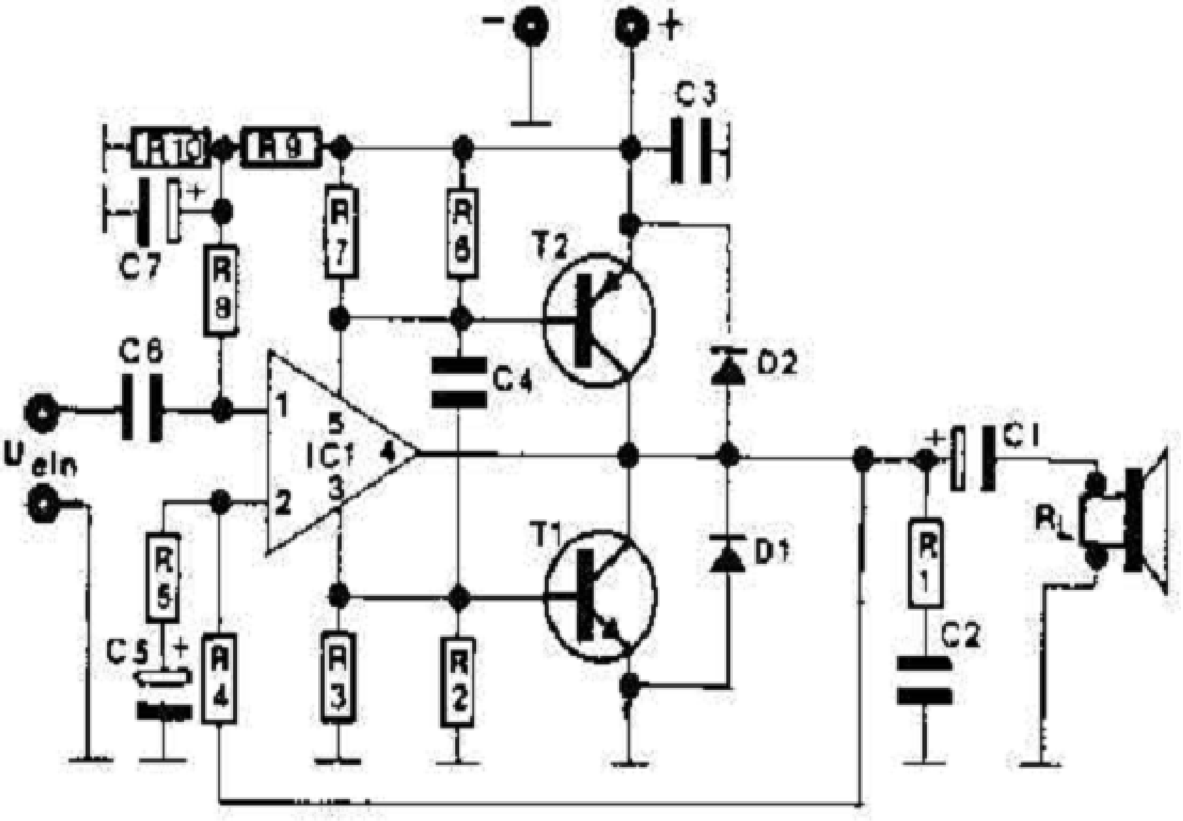
دائرة تكبير ٨٠ وات ، جهد التشغيل من ٢٤ فولت إلى ٤٠ فولت ، تعمل الدائرة في النطاق الترددي من ٢٠ هيرتز إلى ٢٠ كيلو هيرتز ، تستخدم للسماعات من ٤ إلى ١٦ أوم .

High quality power amplifier with IC. Operating voltage: 24...40 Volt. For loudspeaker 4...16 Ohm. F: approx. 20...20.000 Hz. Required cooling element: cooling fin with min. 2K/W (min. approx. 15 x 5 x 3 cm) and insulating material (3 x TO220), not included in the construction set! Please take special care that the elcas (+ and -) and the diodes are mounted correctly. The two transistors and the

IC as well have to be mounted, insulated and plane on a sufficiently great cooling element (min. 2K/W). Please make sure by testing with an ohmmeter that the cooling plates of the transistors and of the IC's do not have actually any conductive connection through the cooling element. The amplifier should never, even for some seconds, be operated for "testing" without cooling element. Due to the great power the transistors may be "killed" within 3..5 seconds by "heat". The amplifier has an input sensitivity of approx. 800mV. If the resistance R4 (100k) will be replaced by a resistance 270k, sensitivity will increase approx. up to 400mV. The circuitry will, however, work considerably more stabilized with 100k. The mains supply unit has to be well filtered and should not show more than 42V during no-load running! For best results, we recommend a stabilized mains supply unit 40V 3A. If the amplifier tends to self-vibration due to a far too low interior resistance of the mains supply unit, it will be necessary to place parallel to the current supply on the amplifier board an elca of 4700µF 50V. The amplifier will achieve max. power at 40V voltage and with a 4 Ohm loudspeaker. With lower voltages and highly ohmic loudspeakers power will accordingly decrease. In case that the input sensitivity is not sufficient for the desired application, it is necessary to pre connect a pre-amplifier. For this purpose, you may use, for example, our pre-amplifier construction set B 073. A pre-amplifier will always be necessary, if it is wanted to connect signal sources with an output voltage below 800mV (e.g. microphones, disc-players, etc.)! Short circuits, overloads, too high operating voltage or too low loudspeaker impedance (under 4 Ohm) will lead to destruction of the IC's and of the transistors! It is advisable to use screened cable for the wiring of the input of the amplifier, connecting the screening network with "earth". Volume can be adjusted with a rotary potentiometer 10k log. (The potentiometer is not included in the construction set).



LAYOUT AND TOP VIEW

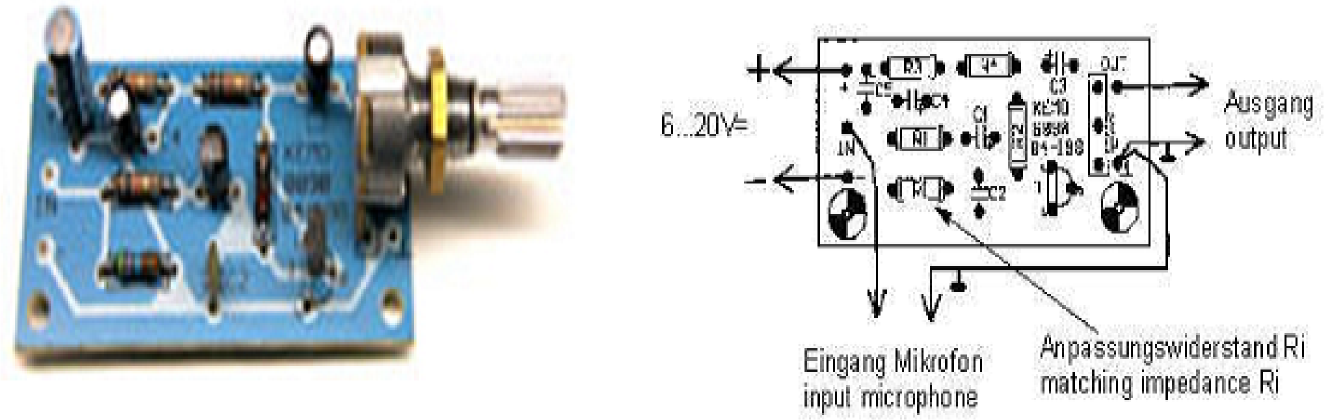


CIRCUIT DIAGRAM

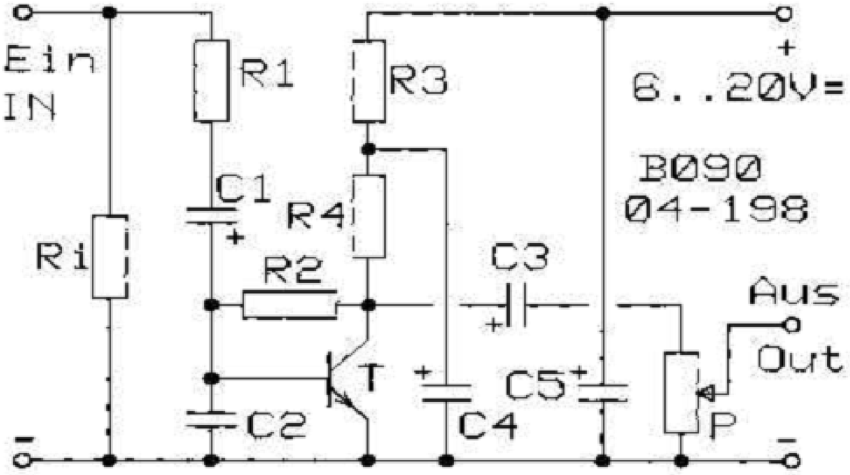
10- Microphone preamplifier No. B090 دائرة مكبر ابتدائى للميكروفون

يمكن ضبط مقاومة الدخل لتلائم أي ميكروفون من ٤ اوم إلى ١٠٠ كيلو اوم ، جهد الدخل من ٠,٠٠٢ إلى ٠,٠٤ فولت ، أقصى خرج للدائرة ١,٨ فولت ويمكن التحكم في قيمة التكبير ، النطاق الترددي من ٢٠ هيرتز الى ٤٠ كيلو هيرتز ، جهد الدخل من ٦ إلى ٢٠ فولت .

The input impedance is adjustable for any microphone from 4 Ohm up to 100 k Ohm.
Input: approx. 2...40mV. Output: max. 1,8 Vpp.
Amplification is adjustable.
F: approx. 20...40.000 Hz. For 6...20 Volt=.
It is advisable to fit the preamplifier into a compact metal housing. Then, it is necessary to ground the housing with the negative pole of the current lead on the printed board. The microphone has to be connected through screened cable, the screening should be connected at the printed board with the ground connection. The output has to be connected also with screened cable. The operating voltage should be supplied either through a battery or through a well filtered power supply. In case that the voltage and the combined ground connection coincide with the reconnected final amplifier, it is possible to take the operating voltage even from the final amplifier. The input impedance could be adjusted through the resistance Ri. Depending on the microphone in use, you may insert into the printed board one of the three enclosed resistances.



LAYOUT AND CIRCUIT VIEW

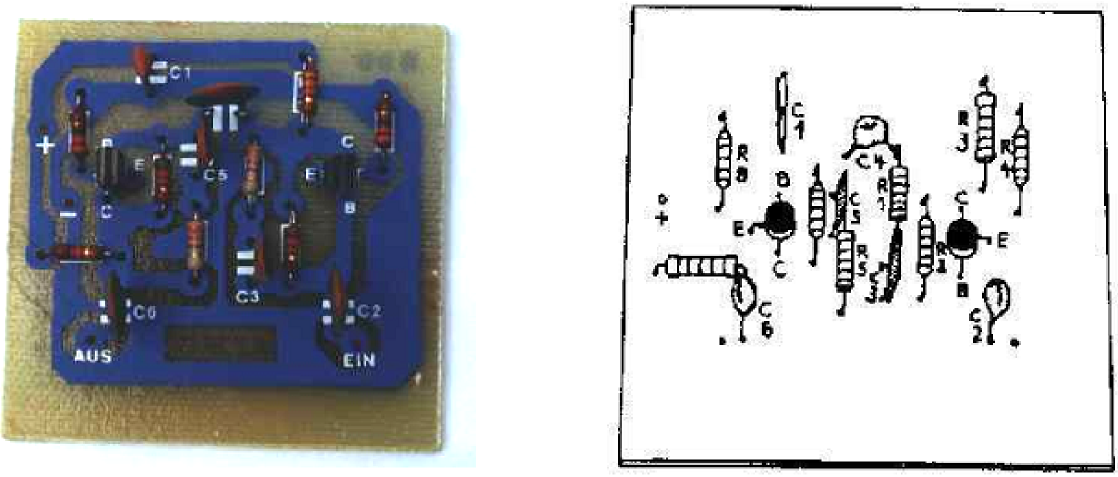


CIRCUIT DIAGRAM

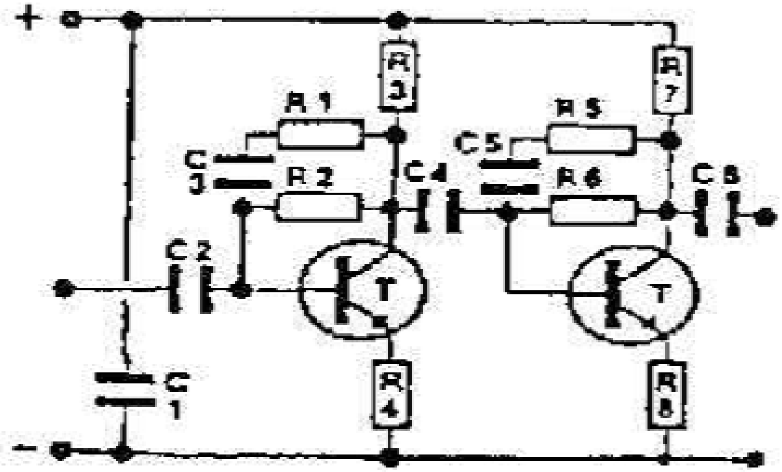
11-SPECIAL ANTENNA AMPLIFIER 30 ... 850 MHz No. B099 دائرة تكبير للهوائي

مكبر لهوائي الاستقبال ذو نطاق ترددي من ٣٠ إلى ٨٥٠ ميجاهيرتز ، جهد التشغيل من ٩ إلى ١٢ فولت ، مقاومة الدخل والخرج ٦٠ أوم ، أقصى قيمة للتكبير ٢٠ ديسيبيل ، وهو مناسب جدا لتقوية استقبال الإرسال التليفزيوني للمستويين VHF و UHF .

Wideband antenna amplifier, approx. 30...850 MHz. Operating voltage: 9...12 Volt. Input and output impedance: 60 Ohm. Amplification max. 20dB. No need of balancing. Especially suitable for amplification of weak television signals within VHF and UHF range as well as for amateurs receivers. Please solder all components parts on the printed board using connecting terminals as short as possible! The antenna coaxial cable has to be connected with the amplifier at the copper surface of the board. Doing so, the inner conductor of the coaxial cable has to be placed on the soldering spots "ON" resp. "OFF" and the screening network on earth. These are the great copper surfaces beside the Kemo mark. The printed board should be mounted into an enclosed metal housing. It is necessary to connect ground (negative terminal) of the printed board with the housing. The nearer the amplifier has been mounted to the antenna, the better the received power. For operation it is necessary to use either a well filtered stabilized power supply or a battery.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

12-VHF-Receiver 9V= No. B100 دائرة استقبال ترددات مرتفعة جدا

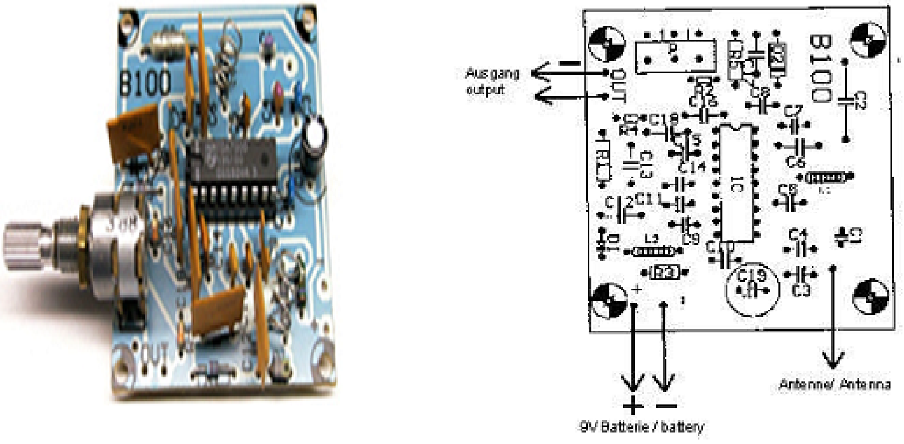
هذه الدائرة تستقبل ترددات ال **VHF** بجودة عالية إذا تم توصيلها بطريقة صحيحة حيث أن هناك ضرورة قصوى يجب عملها للحصول على التنغيم السليم وهي لف عدد ٢ ملف شديدا الحساسية و الاختيارية وهما الملفان **L1** و **L2** واللذان لابد أن يلفا باستخدام السلك المغطى بالفضة المرفق مع الدائرة وبالطريقة الآتية.

١- يلف عدد ٤ لفات من الملف في ٥ مم.

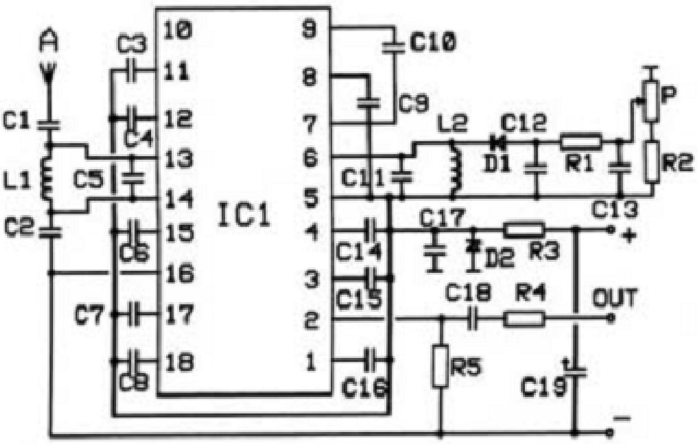
٢- تمد طرفي كل ملف مسافة ٨ مم إلى أن توصل في اللوحة المطبوعة .

High-quality VHF-receiver with special-IC. There are hardly tuning necessity (2 coils to be winded). Extraordinary sensitive + selective. Output: approx. 40mV for a final amplifier or earphone. The two coils L1 and L2 have to be winded using the enclosed silver-coated wire as indicated in the following: At a 5 mm borer you have to wind 4 windings with the wire, then pull out the borer and stretch the two terminals of the coil up to 8 mm, so that they can fit into the drillings of the board. The windings should never have contact. Please take special care while mounting the diodes, that they have been placed on the board the right way (see equipping print page 11). The IC has been marked with a notch at one side, which has to coincide with the corresponding mark on the board. The IC should be placed at last, that means after having finished equipping of the board, into the socket. The printed board has to be operated through a 9V battery. With the aid of the potentiometer it is feasible to adjust the sending stations (tuning). At the antenna

connection you have to place an approx. 80...100 cm wire as antenna (or telescopic antenna). At the outputs of this radio it is either possible to connect a highly ohmic crystal-earphone (impedance 50 K Ohm) or a loudspeaker (for loudspeaker reception). For this purpose, we recommend our well-tried Kemo-amplifier-kits, available in any power between 2.5...200 Watt. Please ask your dealer!



LAYOUT AND TOP VIEW



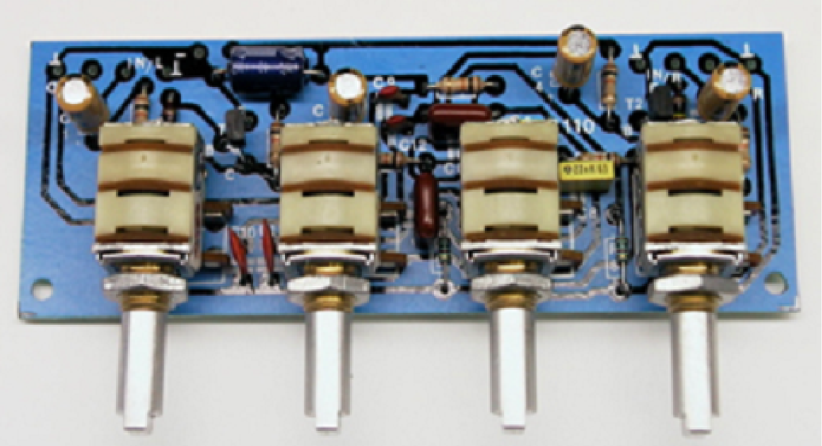
CIRCUIT DIAGRAM

13-Stereo-Tone-Control No. B110 دائرة تحكم في النغمات لصوت ستريو

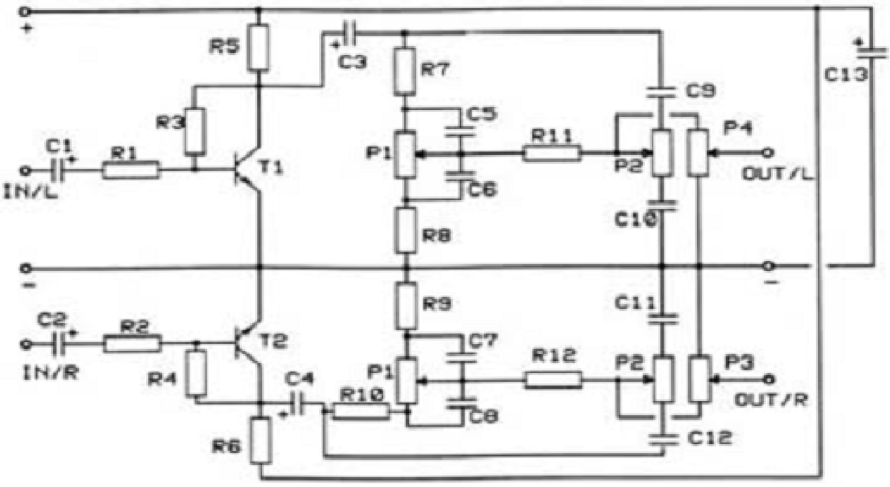
هذه الدائرة يمكن أن توضع قبل خرج مكبر الصوت حيث يمكن التحكم في ال **volume** وال **bass** و ال **treble** كلا على حدة . جهد التشغيل من ٩ إلى ١٨ فولت . كبلات التوصيل من خرج المكبر إلى دخل الدائرة لابد أن تكون معزوله **shielded** حتى لا تتعرض الإشارة إلى التشويش . التحكم في ال **bass** وال **treble** يتم عن طريق المقاومتان المتغيرة **p1** و **p2** . التحكم في ال **volume** يتم عن طريق المقاومتان **p3** و **p4** .

This stereo-tone-control may be connected in front of the output-amplifier. Treble, bass, and volume are separately adjustable. Operating voltage: 9 - 18 volts. The connection cables of output amplifier and signal source (e.g. record player) must be shielded in order to avoid a humming noise. Connect the shielding to the connection indicated by the mass-symbol. It is also recommended to encase the board in a shielding case (metal housing). The metal case must be connected to mass.
Treble and bass of both stereo-channels can be adjusted with the stereo-tandem potentiometers P1 + P2). The volume of the right and the left channel is

separately adjustable with potentiometer P3 and P4. Due to this, a balance regulator is not necessary.



LAYOUT AND TOP VIEW



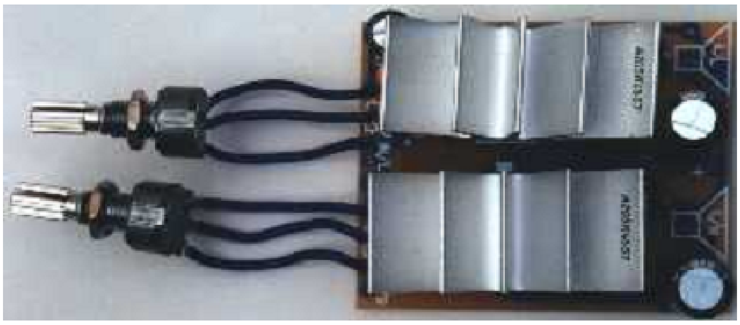
CIRCUIT DIAGRAM

14-Stereo amplifier 2 x 8 Watt - 6...15 V No. B114 دائرة مكبر ستريو ٨ وات

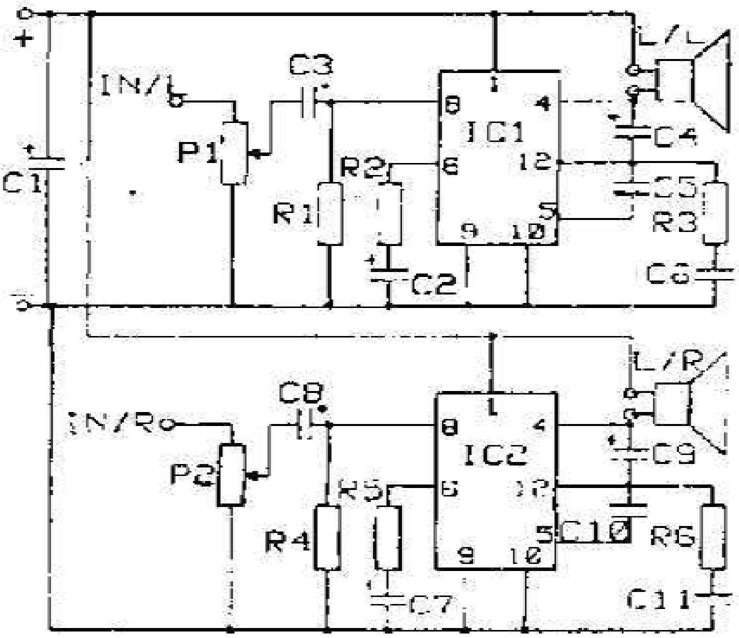
تستخدم هذه الدائرة مع السماعات من ٤ الى ١٦ اوم ولها حساسية جهد دخل 250mV وفي حالة ما إذا كانت مصادر الإشارة تعطي اقل جهد خرج اقل من جهد الدخل المطلوب لتشغيل الدائرة لابد من توصيل مكبر ابتدائي للإشارة مثل B073 وسوف تحقق الدائرة أقصى قدرة لها فقط عندما تعمل على 15V مع سماعه 4Ohm .

For loudspeaker 4...16 Ohm All components parts have to be mounted, according to the parts list, onto the printed board, including the potentiometers. The amplifier has an input sensitivity of approx. 250mV. In case that the signal sources are to be connected at minor output voltages (e.g. microphones), it is necessary to pre connect a preamplifier. We recommend, depending on the different usages, our universal preamplifier B073, our stereo sound corrector with

preamplifier B110 or when using magnetic stereo record players our stereo equalizing preamplifier B074. The amplifier will achieve maximal power solely with 15V operating voltage and with a 4 Ohm loudspeaker. With minor operating voltages and higher loudspeaker impedance rates power will increase correspondingly. Please use solely screened wires when carrying out the connections at the input of the amplifier and make sure connecting the screening network with "earth" (negative battery). The screened wire will avoid any hum interferences within the amplifier.



TOP VIEW



CIRCUIT DIAGRAM

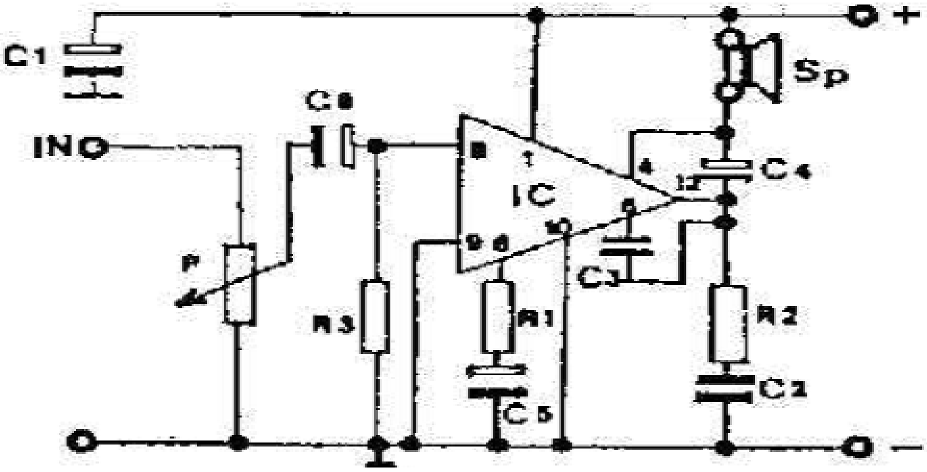
15- Amplifier 8 Watt No. B115 دائرة مكبر ٨ وات

مكبر هاي فاي ، جهد التشغيل للدائرة من ٦ إلى ١٦ فولت . يمكن أن نستخدم مع الدائرة سماعات من ٤ إلى ١٦ اوم، النطاق الترددي المناسب لعمل الدائرة من 40Hz إلي 20KHz . المقاومة المتغيرة p توصل على اللوحة المطبوعة باستخدام أسلاك قصيرة ولا توصل مباشرة على اللوحة المطبوعة .

HiFi-amplifier with one IC. Operating voltage: 6...16 Volt. Sensitivity: approx. 160mV, for loudspeakers 4...16 Ohm. Frequency range: 40Hz-20kHz. The

potentiometer "P" has to be connected through short wires with the printed board. At the amplifier could be connected signal sources with at least 160mV output voltage (e.g. crystal record players, cassette recorders, etc.). With a pre-amplifier (e.g. kit B 073) it will be feasible to increase the sensitivity up to approx. 1mV. Then, it would be possible to connect microphones, too. In case that you want to connect at the amplifier magnetic record players, it will be necessary to pre-connect an equalizing pre-amplifier (e.g. B 074).
The amplifier will achieve its max. power with 8 W at an operating voltage of 16 V. With lower voltage, the max. power will decrease correspondingly.

TOP VIEW



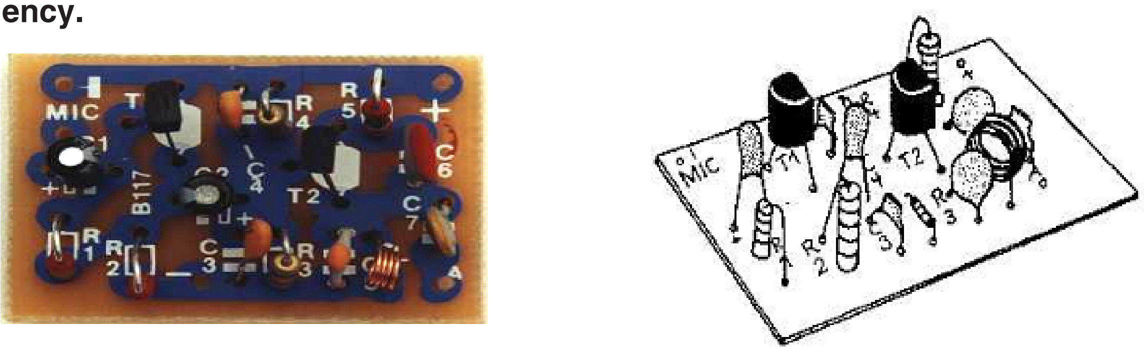
CIRCUIT DIAGRAM

16- Mini-VHF-oscillator No. B117 — دائرة مذبذب إرسال ترددات VHF

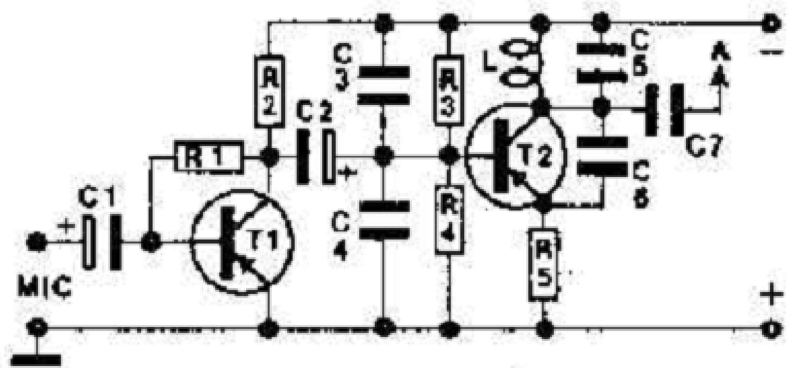
هذه الدائرة تقوم بتوليد ترددات في نطاق ال VHF من 88MHz إلى 108MHz وتعمل بجهد تشغيل 9V وشديدة الحساسية لدخل الميكروفون و المسجل و مولد الإشارة . مع الأخذ في الاعتبار أن استخدام هذه الدائرة ممنوع في بعض التطبيقات وفي بعض البلاد. ومن الممكن استخدام دائرة الإرسال هذه في السفن في البحار لاستعمالها في حالات الطوارئ .

88...108 MHz. Operating voltage: 9 Volt battery. Extremely sensitive input for microphones, record-players, signal generator etc.
Attention: The operation and the possession of this transmitter as monitoring transmitter (Mini-agent) or as any other free radiating transmitter is liable to penalty It is absolutely necessary to operate the device exclusively for test purposes after having placed it into a HF-proof metal housing (according to communication regulations it is forbidden to radiate any HF-radiation externally). Possibly the transmitter may be used on ships within international seas, e.g. as

SOS-transmitter, for the own radio-station, etc. The coil has been enclosed already wound and has to be soldered into the holes marked with "L". The microphone input is extraordinary sensitive. In case the transmitter may overdrive after receiving an extreme input signal, it is necessary to pre connect a trimmer potentiometer of approx. 100kOhm as voltage separator. Please observe the communication regulations! Adjustment of the transmitter: During battery operation with a 9V-battery the transmitter mounted according to the parts list will oscillate at approx. 90...100 MHz. Through stretching or pressing together the turns of the coil "L" it is feasible to modified considerably the transmitting frequency.



LAYOUT AND TOP VIEW



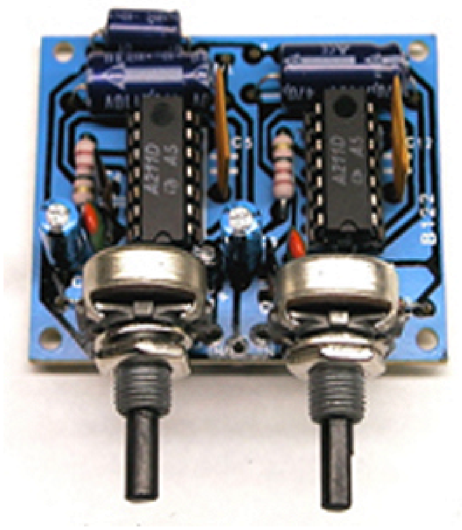
CIRCUIT DIAGRAM

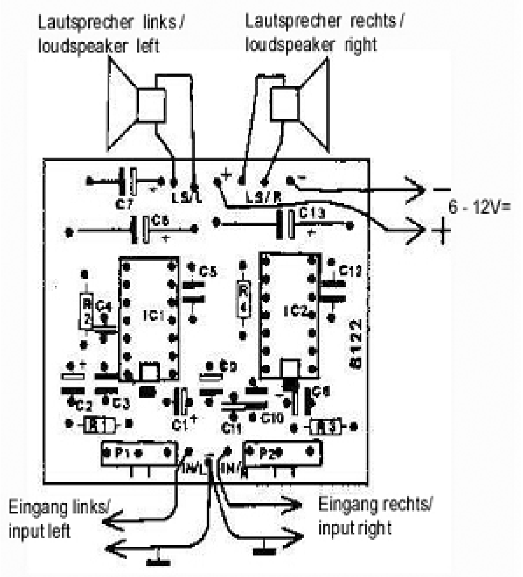
17- Stereo-amplifier No. B122 2 x 2,5 watt دائرة مكبر ستريو ٢,٥ وات

يجب لحام المقاومة المتغيرة مباشرة على اللوحة المطبوعة حساسية الدخل 100mV . جهد التشغيل للدائرة ١٢ فولت
وتعطي افضل تكبير مع السماعات ٨ اوم .

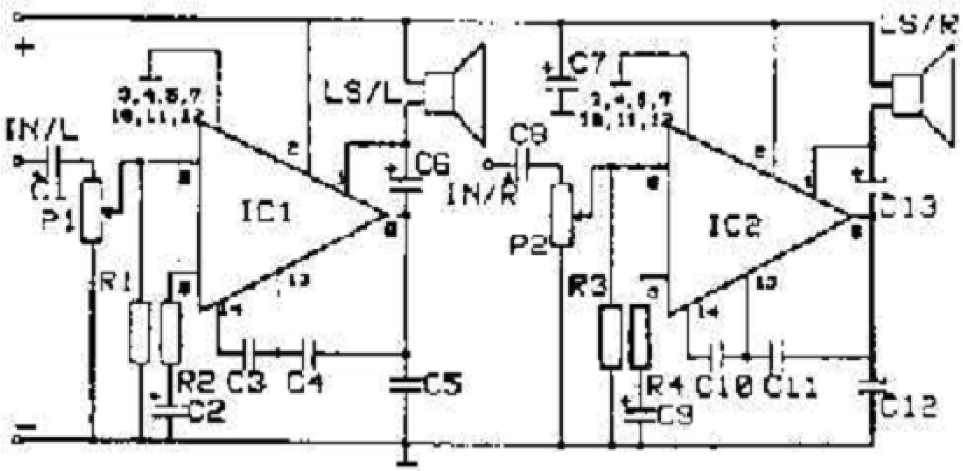
Constructing instructions: The potentiometer are soldered directly on the printed wiring board. The IC's have at one side a notch, which has to coincide with the printed notch on the equipment print. The IC's may get hot during use. Please take special care of using the right polarity of the Elkos (+ and -). The amplifier has an input sensitivity of approx. 100mV. If it is desired to connect signal transmitters with inferior output voltage (eg. some microphones), a preamplifier has to be connected in series. We recommend for this purpose, depending on the intended use, our universal-stereo-preamplifier B142 or, for magnetic stereo record player our equalizing-preamplifier B074. Any signal source with superior output voltage as 100mV, as eg crystal record player, cassette tape-recorder, diode receiver etc. can, of course, be connected directly. The amplifier achieves its maximal power only with 12V operating voltage and using a 8 ohm loudspeaker. With inferior operating voltage and superior impedances of the

loudspeaker, power will decrease respectively. Please use as junctions for the amplifier nothing but screened cable and connect the screening network with ground. The screened cable will prevent any hum interferences in the amplifier.





LAYOUT AND TOP VIEW



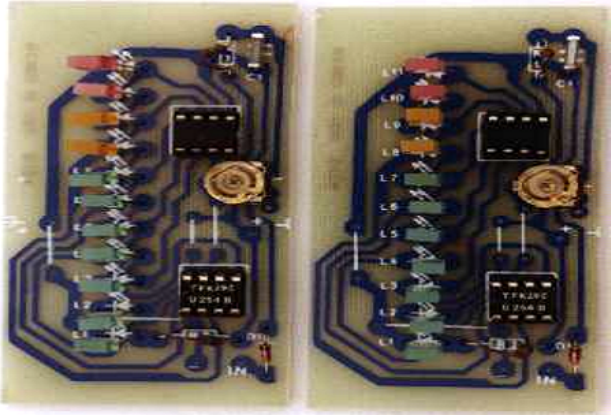
CIRCUIT DIAGRAM

18- STEREO LED-VOLUME INDICATOR 2 x 11 LED's No. B124

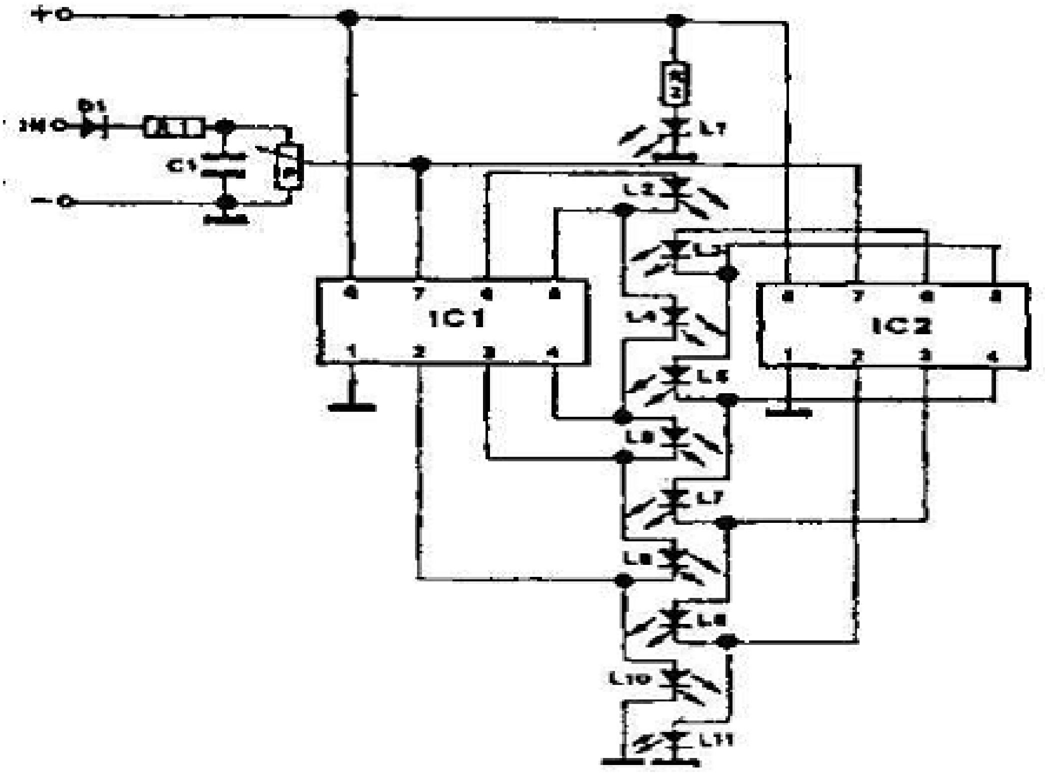
دائرة توضيح لمستوى صوت استريو

تستطيع الدائرة توضيح (قياس) مستوى الصوت من ٢ وات إلى ١٠٠ وات وذلك عن طريق 22 LED في صفين . جهد التشغيل للدائرة ١٢ فولت . مع الآخذ في الاعتبار تركيب ال LEDS بطريقة صحيحة على اللوحة المطبوعة .

Almost inertia less volume indicator for amplifier units from 2...100 Watt. Indication is realized through 22 LED's (2 x 11 LED). Operating voltage: 12 V. Easy connection with the loudspeakers. Please take special care when mounting the LED's and IC's that correct fitting has been carried out. The IC's have been designed with a notch or a point at one side, which has to coincide with the print on the board. The connections of the printed circuit board, marked with "INPUT", should be connected parallel to the loudspeaker cabinet. Each stereo-channel has an own indicator board. Through the trimmer potentiometer it is feasible to adjust the max. measurement range.



LAYOUT AND TOP VIEW



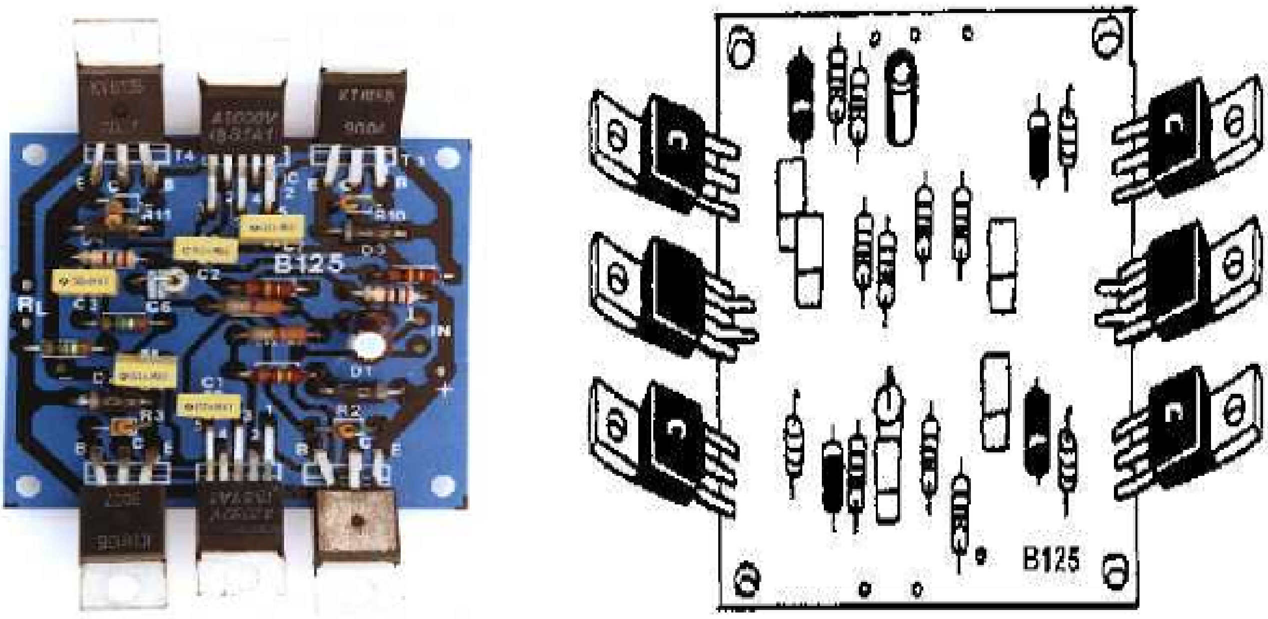
CIRCUIT DIAGRAM

19- 200W – Amplifier No. B125 دائرة مكبر ٢٠٠ وات

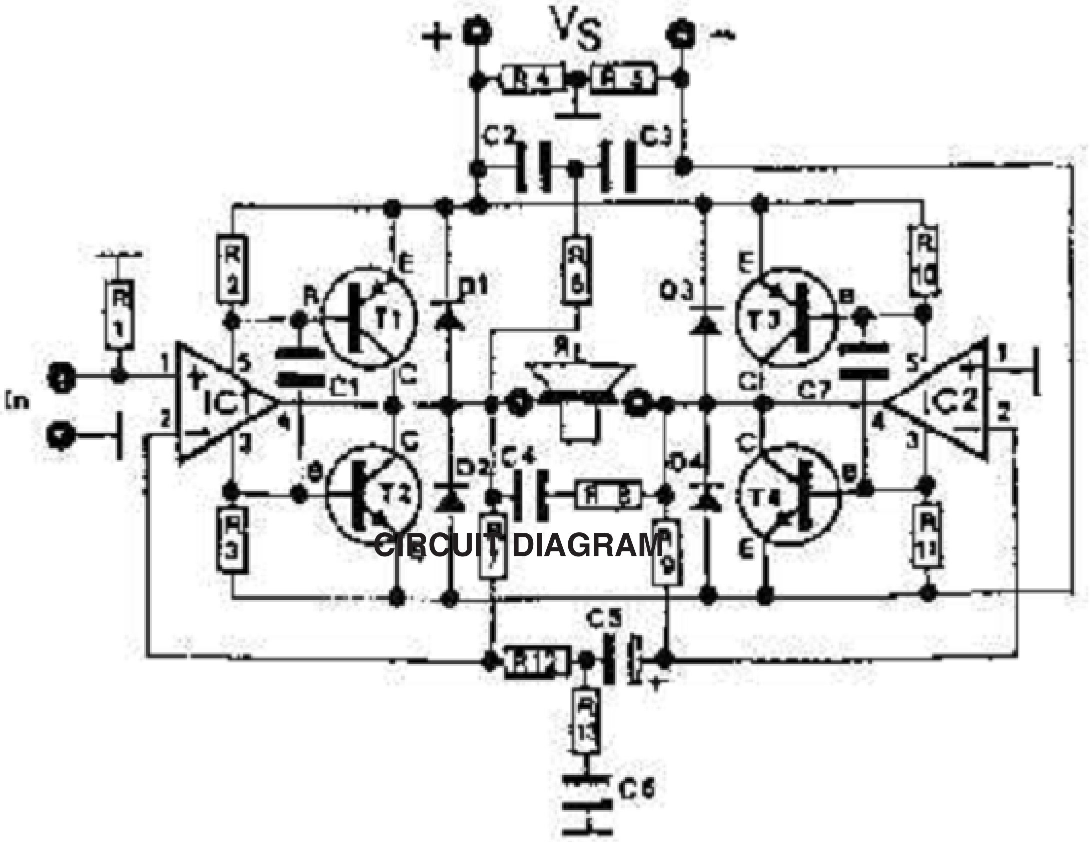
دائرة مكبر عالي القدرة والجودة تعمل مع السماعات من ٤ اوم إلى ١٦ اوم وجهد تشغيل الدائرة من ٢٤ فولت إلى ٣٦ فولت و أقصى تيار دخل ٥ أمبير. النطاق الترددي للدائرة من ٢٠ هيرتز إلى ٢٠ كيلو هيرتز . مع مرعاه عملية تبريد للترانزيستور بتوصيله بجسم معدني .

High-power amplifier of top-class quality for loudspeaker from 4...16 Ohm. Operating voltage: 24...36V, max. 5A. F: 20...20.000 Hz. Required cooling element:

cooling fin with min. dimensions 20 x 10 x 4cm or greater (thermal resistance < 1K/W). Please take special care that the transistors and the IC's have been fixed firmly at solely one or two separated cooling elements with sufficient dimensions for this purpose (thermal resistance < 1K/W). Doing so, it is necessary to mount the transistors and the IC's insulated (with mica washer and plastic nipple) according to the figure (page 15)! Please make sure before first operation that the transistors and the IC's really do not have any electrical connection towards the cooling plate! (With the aid of an ohm-meter). The transistors have to be placed plane and firmly onto the cooling element! It is of extraordinary importance with this high-power amplifier that there is a considerable heat dissipation! A "test-run" without cooling element even for some seconds is impossible! The already mounted cooling element should be situated in a well ventilated case. The power supply should be sufficiently powerful, power consumption of the amplifier may increase up to 5A. In case of using an unstabilized power supply, it is advisable to place a transformer of max. 28V. The amplifier will then show solely approx. 120W at a 4-Ohm loudspeaker, for it no-load voltage of the power supply will not be too high. If it is desired to use complete power, it is necessary to place a stabilized power supply with approx. 36V 5A. No-load voltage should not pass over 44V! As filter elca it is advisable to choose values of min. 10.000µF / 50V! The cables leading to the current supply and to the loudspeakers should have at least a cross section of min. 1,5mm². The connected loudspeaker have to be equipped according to the high output power and should not have a lower impedance as 4 Ohm! With lower connecting impedance and short circuit within the loudspeaker wiring, the transistors will be destructed. The amplifier has an input sensitivity of approx. 500...800mV. Therefore, it is possible to connect directly at the amplifier tape decks, tuners, etc. In case there are connected signal sources with lower output voltage, it is necessary to pre-connect a pre-amplifier (e.g. our pre-amplifier kit B 073). Then it will also be possible to connect microphones, etc.



LAYOUT AND TOP VIEW



CIRCUIT DIAGRAM

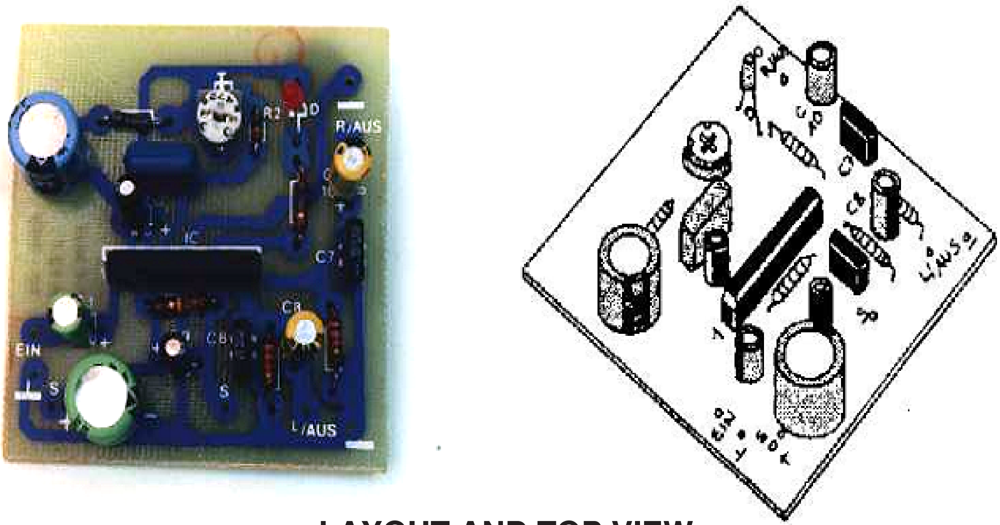
20- Stereo-Decoder No. B127 دائرة استريو ديكودر (تشفير إشارة ستريو)

دائرة الديكودر توصل عند الطرفين A F عند خرج إشارة ال VHF . ويمكن بعد ذلك توصيل مكير استريو عند خرج الديكودر. الديكودر يتطلب أن تكون إشارة الدخل اكبر من ١ فولت . ولابد من توصيل المكونات بطريقة صحيحة علي الدائرة . وفي حالة كون الإشارة غير كافية أي اقل من ١ فولت فأنها تؤخذ من طرفي خرج السماعات .

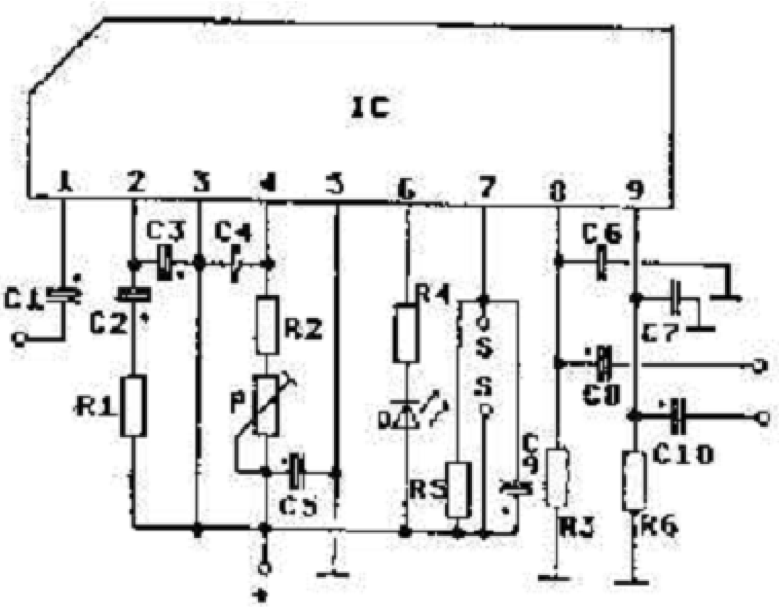
The decoder has simply to be connected at the A.F. output (e.g. loudspeaker connection) of a VHF-radio. It is then possible to connect at the output of the decoder a stereo amplifier. Disconnectedly, automatic switch-over mono-stereo when receiving the stereo signal. Stereo indication through LED. Operating voltage: 4.5...12V

Please take special care that the printed board has been correctly equipped. The notch at the IC has to coincide with the one at the print of the board. Furthermore, it is necessary that the LED, the diodes and the elcas have been fitted correctly into the board. The decoder requires an input signal of approx. 1V.

In case that this signal isn' t sufficiently strong at the TAPE socket of the radio, it will be necessary to take it from the loudspeaker output of the radio. Doing so, it is advisable not to adjust the radio too loud, because otherwise the decoder could be over amplified. In case that the decoder will be operated permanently on automatic operation (automatic mono / stereo switch-over), the two contacts "s+s" at the board have not to be connected. In case you also want to adjust the decoder by hand into mono, it is possible to connect at "s+s" a switch in order to achieve switching-over into "mono" in case of especially weak signals. The decoder will be balanced through the potentiometer "P". You have to tune in a stereo transmission and to adjust the potentiometer "P" till the LED lights up. Now, you should regulate the potentiometer setting the centre position of the luminous range. It is then feasible to connect at both outputs "left" and "right" a stereo amplifier. Please use solely screened cable. The screening network has to be connected with the ground-connections.



LAYOUT AND TOP VIEW



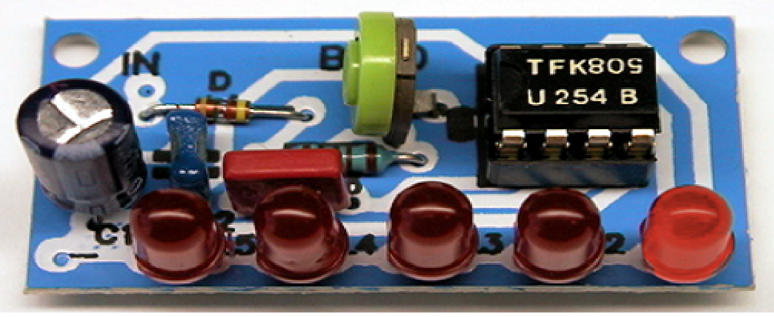
CIRCUIT DIAGRAM

21- LED-Recording Level Indication LED Volt- and Ammeter No. B130

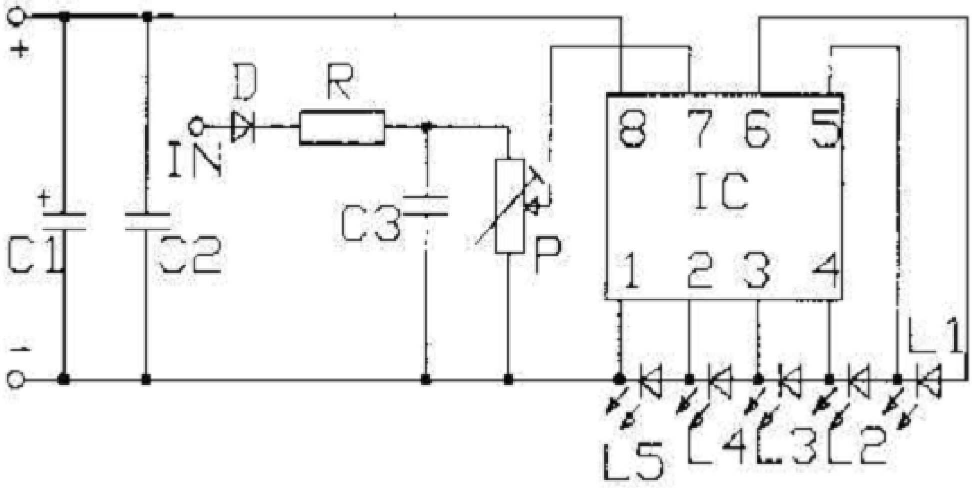
دائرة قياس مستوى الصوت باستخدام LEDS

دائرة توضيح لمستوى الصوت باستخدام 5LEDS . جهد التشغيل للدائرة ١٢ فولت .

Almost inertia-free measuring instrument with 5-LED-indication. Perfect as recording level indication for amplifiers or loudspeaker enclosures, as volt- or ammeter etc. For 12 Volt. When tipping the board please pay attention to the right polarity of the ICs. The notch or the point on the one side of the IC must correspond to the tip print on the board. The LEDs are flattened on one side. The operating voltage for the board is 12V. In case of using as a recording level indication for amplifiers the input "IN" of the board must be directly connected parallel to the loudspeaker box of the amplifier. Then the LED-VU-Meter will be put to full deflection (the 5th LED just begins to glow) by using the trimming potentiometer at full volume. In case voltages shall be measured then the polarity for alternating voltage does not matter. With direct voltage the positive pole must be at the connection marked with "+". For voltage measurements over 20V the protective resistor R must be increased accordingly (e.g. up to 100 Volt 50 k Ohm). In case of usage as ammeter the board must be connected according to the following connection diagram. The resistor "X" should be calculated in such a way that the LED indication indicates total at max. current.



LAYOUT AND TOP VIEW



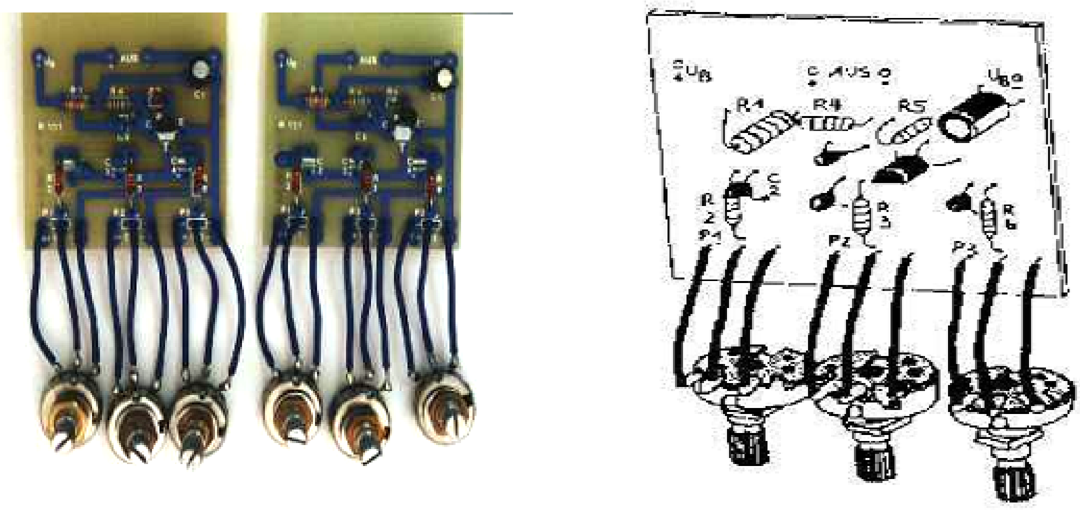
CIRCUIT DIAGRAM

22- Stereo - Mixer Unit No. B131 دائرة ميكسر استريو

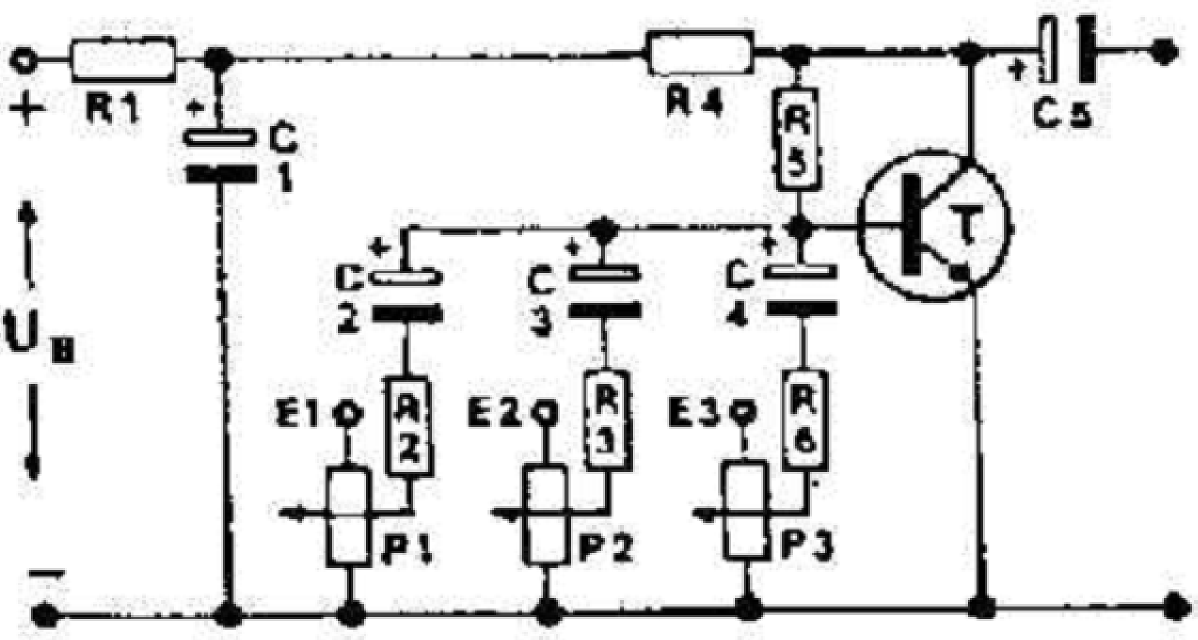
دائرة ميكسر لثلاث إشارات يمكن التحكم في كلا منها على حدة . جهد التشغيل للدائرة من ٦ فولت إلى ١٢ فولت والخرج ٣ فولت. النطاق الترددي من ٢٠ هيرتز إلى ٢٠ كيلو هيرتز . كل إشارة دخل توضع على دائرة منفصلة. كما يجب وضع المكونات على الدائرة بطريقة صحيحة.

It is possible to mix up 3 stereo signals and to adjust each channel separately. Operating voltage: approx. 6...12 Volt. Output: max. 3V. F: 20...20ooo Hz. Each stereo channel has been mounted at an own printed board. Therefore, it is possible to mount them separated from each other in a housing. Please take special care when placing the tantalum elcas. One of the connections has been marked with a positive mark (+). This pole must coincide with the positive pole (+) at the board. All cables leading to the input or output of the board should be made out of screened cable. Doing so, the screening network has to be

connected always with "ground". The ground pole has been marked on the board with (-). It is advisable to fit the boards into a metal case and to connect the case with " ground" as screening box. Otherwise, there could be hum interferences.
It is feasible to connect at the input of the mixer unit microphones, tape recorders, record players, etc. The output has to be connected with an amplifier. Caution! Working with too small (highly ohmic) batteries for the current supply, it is possible that the pre-amplifier does oscillate and it may produce by itself sounds. In those cases it is necessary to connect parallel to the current input at the board an elca of approx. 1000µF 20V (parallel to the battery). When fixing metal knobs on the potentiometers, there could be some kind of humming in the loudspeaker while touching the potentiometers. In those cases it is necessary to connect the cases of the potentiometers also with "ground".



LAYOUT AND TOP VIEW

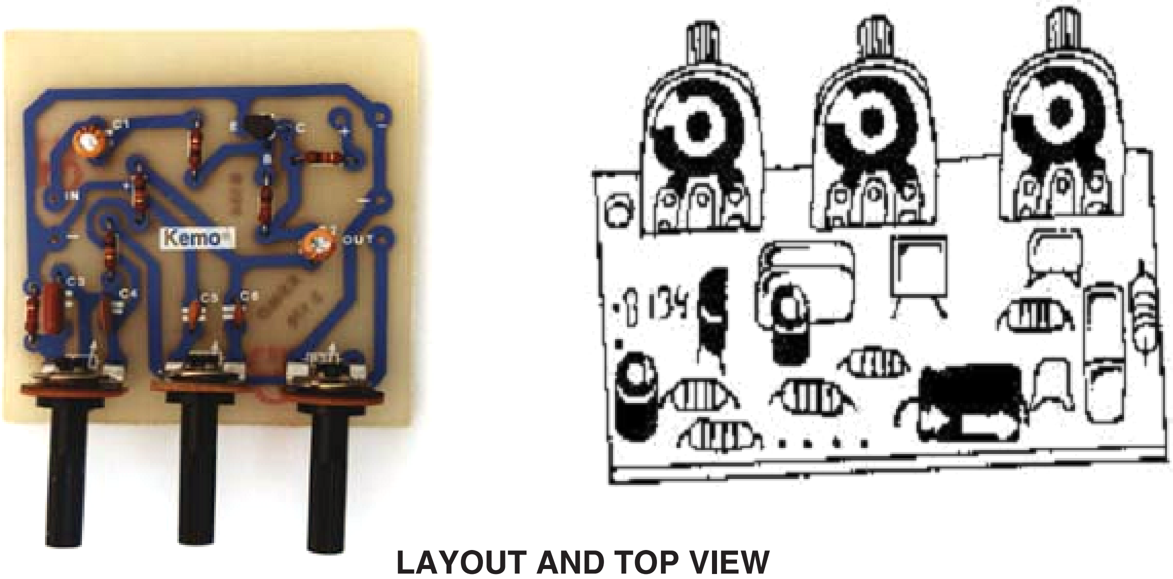


CIRCUIT DIAGRAM

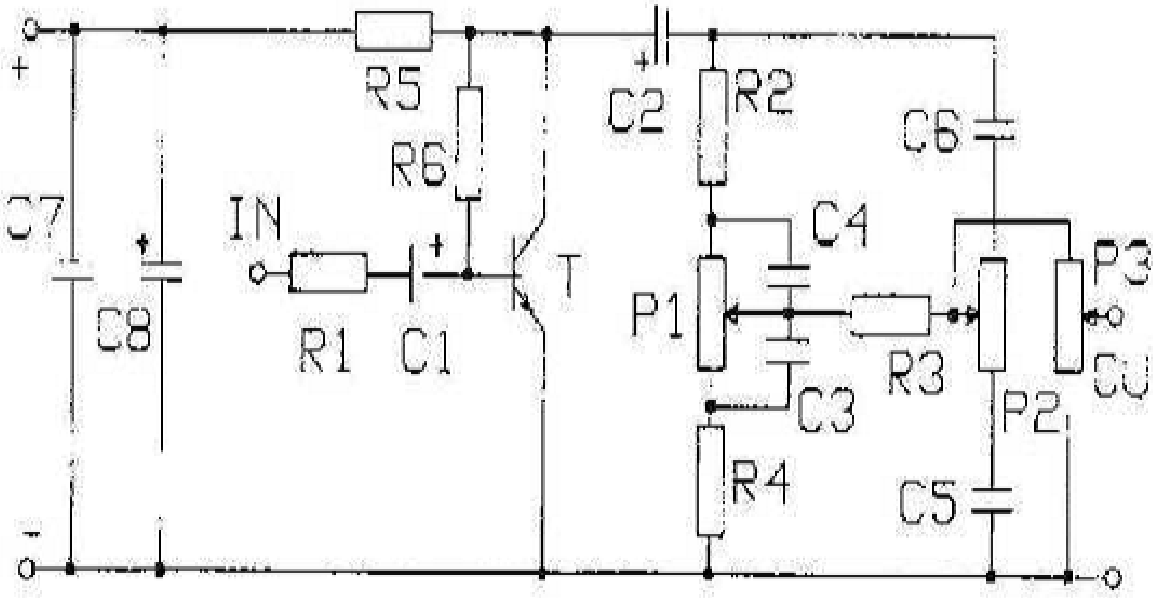
23- Mono Sound Controller separate treble, bass and volume regulation No. B134 دائرة تحكم في اشارة صوت أحادية

توصل الدائرة على خرج مكبر الصوت . جهد التشغيل للدائرة من ٩ فولت إلى ١٨ فولت. كما يتم لحام المقاومات المتغيرة مباشرة على اللوحة المطبوعة . ولتجنب تدخل إشارات غير مرغوب فيها مع الإشارة الأصلية نقوم بتوصيل مصدر الإشارة مع دائرة التكبير باستخدام كبلات معزولة .

This mono sound controller must be superposed to the mono final amplifier. Trebles, basses and volume are adjustable separately. Operating voltage: 9...18 Volt. The three potentiometers must be soldered directly on the board. In order to avoid hum interferences the connection cables to the signal source (e.g. record player) and to the final amplifier must be installed with shielded cables. The shielding has to be put to the connection with the minus (sign.) "-". It is also recommendable to install the board inside a shielded housing (metal housing). Then the housing must be connected with minus "-".



LAYOUT AND TOP VIEW



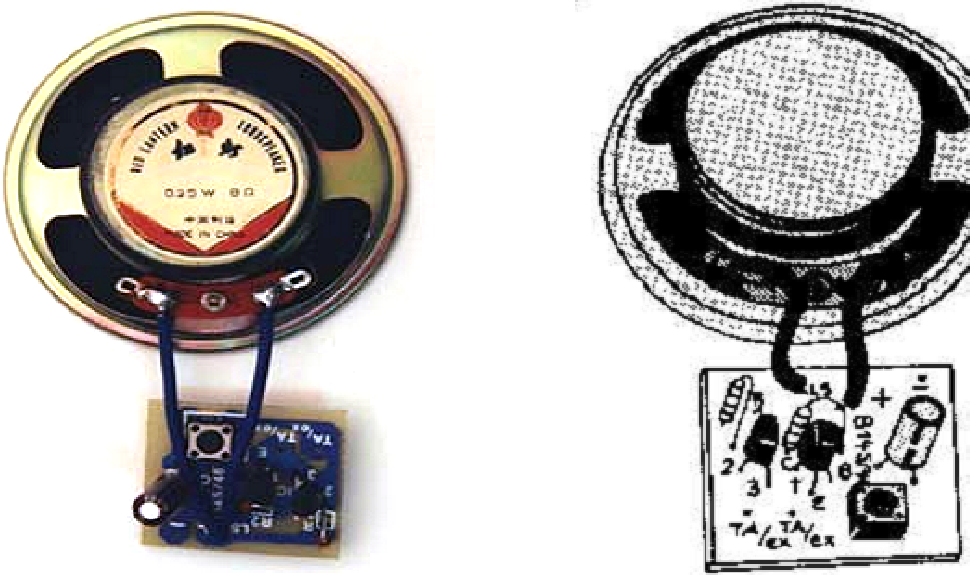
CIRCUIT DIAGRAM

24- ELECTRONIC MELODY "It´s a small world" No. B145 دائرة توليد نغمات

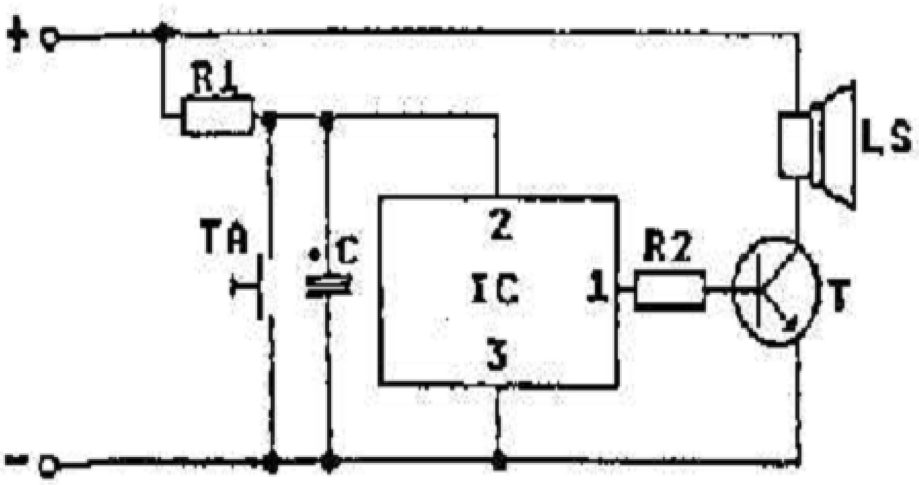
الدائرة تقوم بتشغيل نغمة WALZ الشهيرة لمدة طويلة وبصوت عالي الجودة ويبدأ التشغيل بالضغط على الأزرار ويتوقف آليا . جهد التشغيل للدائرة ٣ فولت . كما يجب وضع المكونات بطريقة صحيحة على الدائرة المطبوعة.

plays for a long time the famous Walz melody in an expressive high-quality sound. The melody will start through a push-button and stop automatically. Loudspeaker included. Operating voltage: 3V.

The printed circuit board should be equipped following the component print. After having applied the operating voltage (1,5 ... 3 Volt), you may push the button "TA" and, now, the melody will be heard. Whenever the button is pushed, the melody will sound again. It is possible to use another push-button (e.g. bell-push for doors), the printed circuit board has been designed to realise this connection. Attention! In case of too high operating voltage, false polarity and short circuits within the loudspeaker connection, the device will be destructed. Fitting the loudspeaker in a housing with sound aperture will improve considerably the quality of sound.



LAYOUT AND TOP VIEW

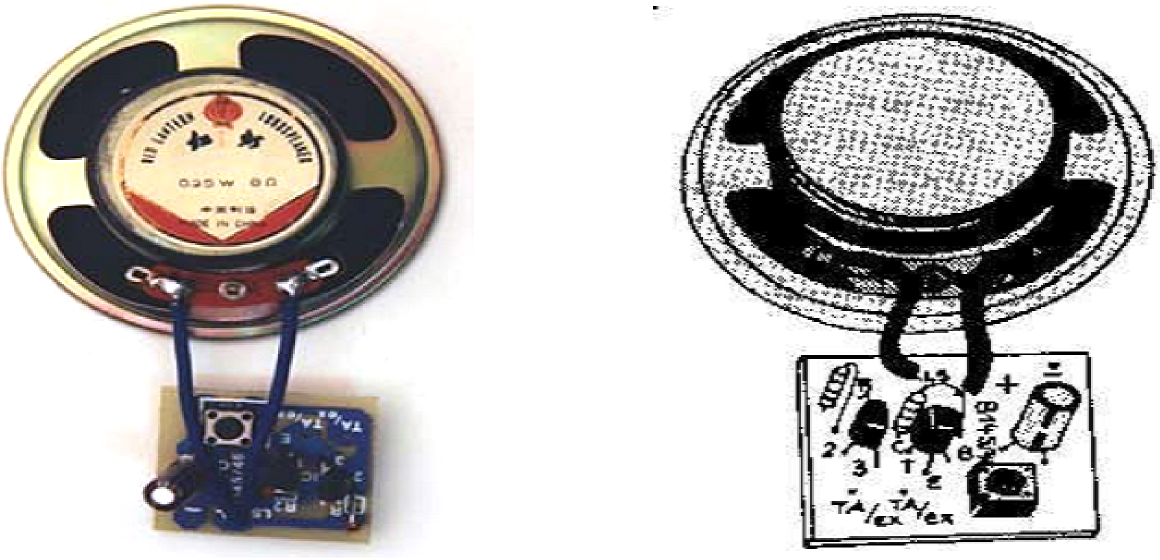


CIRCUIT DIAGRAM

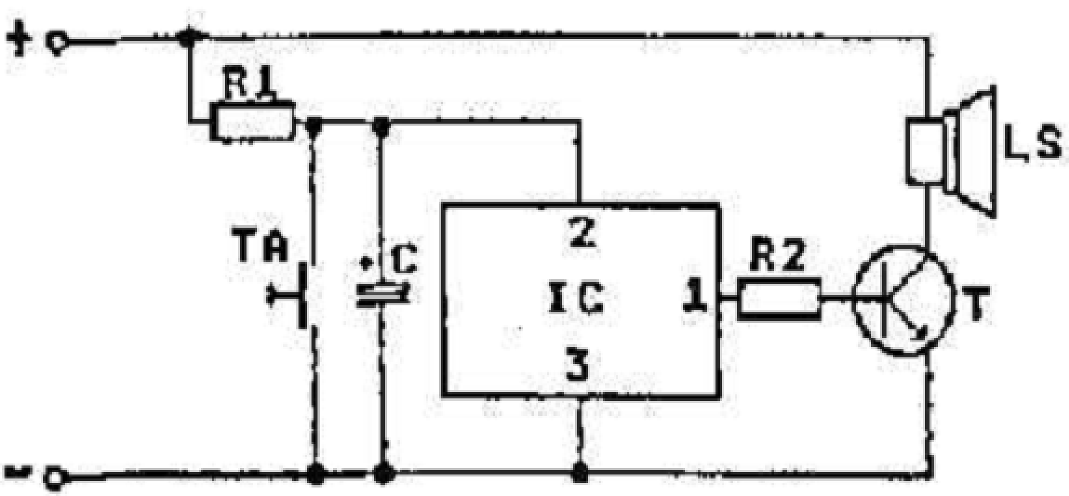
25- ELECTRONIC MELODY "Coo Coo Walz" No. B146 دائرة توليد نغمات

الدائرة تقوم بتشغيل نغمة (Coo Coo WALZ) الشهيرة لمدة طويلة وبصوت عالي الجودة ويبدأ التشغيل بالضغط على الأزرار ويتوقف آليا . جهد التشغيل للدائرة ٣ فولت . كما يجب وضع المكونات بطريقة صحيحة على الدائرة المطبوعة.

plays for a long time the famous Waltz melody in an expressive high-quality sound. The melody will start through a push-button and stop automatically. Loudspeaker included. Operating voltage: 3V. The printed circuit board should be equipped following the component print. After having applied the operating voltage (1,5 ... 3 Volt), you may push the button "TA" and, now, the melody will be heard. Whenever the button is pushed, the melody will sound again. It is possible to use another push-button (e.g. bell-push for doors), the printed circuit board has been designed to realize this connection. Attention! In case of too high operating voltage, false polarity and short circuits within the loudspeaker connection, the device will be destructed. Fitting the loudspeaker in a housing with sound aperture will improve considerably the quality of sound.



LAYOUT AND TOP VIEW

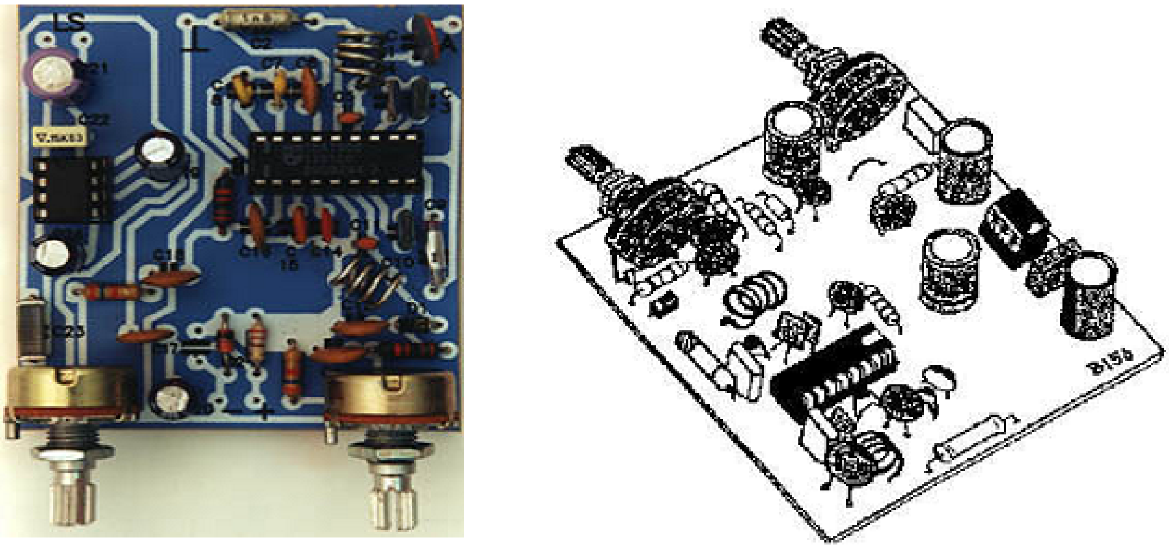


CIRCUIT DIAGRAM

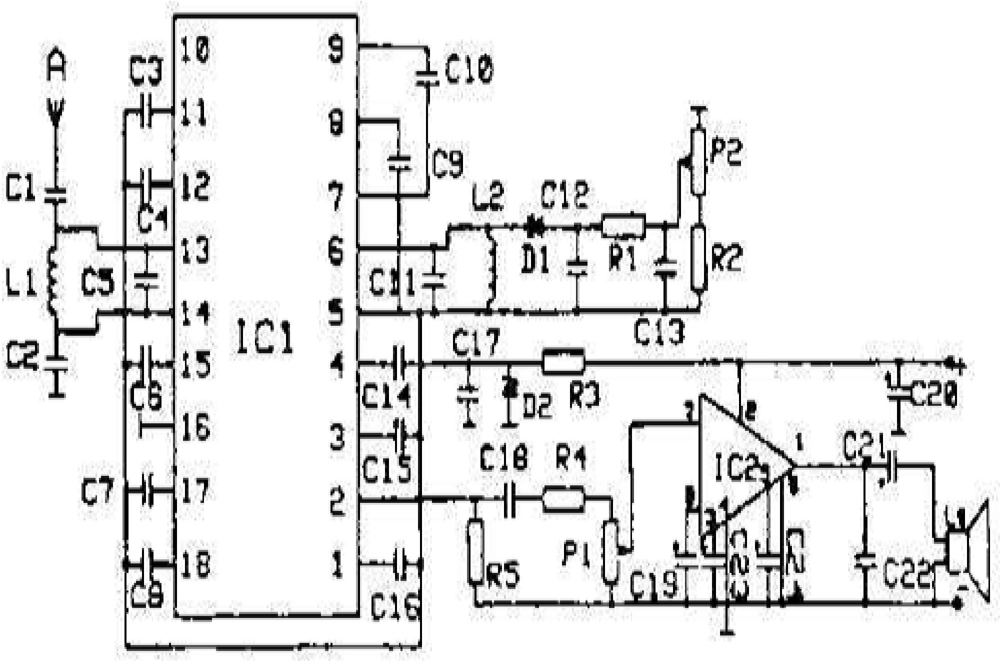
2٦- FM-Receiver No. B156 دائرة استقبال تعديل ترددى

تستخدم هذه الدائرة للشرطة أو للطيران . النطاق الترددي الذي يمكن استقباله من ١٠٨ ميجاهيرتز إلى ١٣٢ ميجاهيرتز .
وهي دائرة استقبال عالية الجودة باستخدام ال IC TDA 7000 و نستخدم مع الدائرة سماعات ٨ اوم .

**Also for police radio and aeronautical radio service
approx. 108 - 132 MHz
High-quality receiver with the IC TDA 7000. Excellent reception properties + selectivity. Loudspeaker connection 8 Ohm (1W). Very simple construction, almost no alignments are necessary. Operating voltage 9 Volt approx. 88 - 108 MHz. Licensed radio amateurs may extend the frequency area of this FM-receiver up to approx. 132 MHz. The two coils L1 and L2 will be winded by using the enclosed piece of silver-plated wire as follows: Coil up 4 windings with the wire on a 5mm drill, pull the drill out again and extend the two connection wires of the coil to 8mm (so that they fit into the drillings of the board). The windings must not get in contact with each other. During installation of the electrolytic capacitors and the diodes please pay attention that they will be inserted in the board in the correct direction. The ICs have a notch on one side which also must correspond to the respective mark on the board. At first the IC holders must be soldered in and finally the ICs will be put into the holders in the correct direction. The potentiometers have to be soldered directly on the board. Please do not forget the wire strap on the board. Starting: A loudspeaker of 8 Ohm will be connected which should not be too small (ideal 1 Watt) in order to obtain a good sound at optimal volume. As current supply a bigger 9V battery should be used (e.g. two 4.5V flat batteries in series). The small 9V transistor-compound batteries are discharged too fast as the VHF-radio has a strong 1 Watt high-level stage. As antenna serves a telescopic antenna or e.g. a piece of wire of approx. 80...100cm length. If you switch on now and the volume control (P1) will be advanced, a noise should be audible. By using the potentiometer P2 you now can tune-in a station. By modifying the oscillator coil L2 the range of reception can be changed. Either by pressing or extending the coil or if you take another number of turns. Reducing the coil results in a displacement of the range of reception upwards (>108 MHz), an increase in a range of reception downwards(< 88 MHz). Unauthorized persons are not allowed to receive other frequencies than the normal VHF radio frequency! Changes may only be carried out by amateurs possessing a corresponding license! You may also extend the frequency area up to 132 MHz. In this case please replace coil L2 by a coil with 2 windings. Now the frequency area amounts to approx. 88 - 132 MHz. But this may only be done by radio amateurs who are in possession of a corresponding valid license!**



LAYOUT AND TOP VIEW



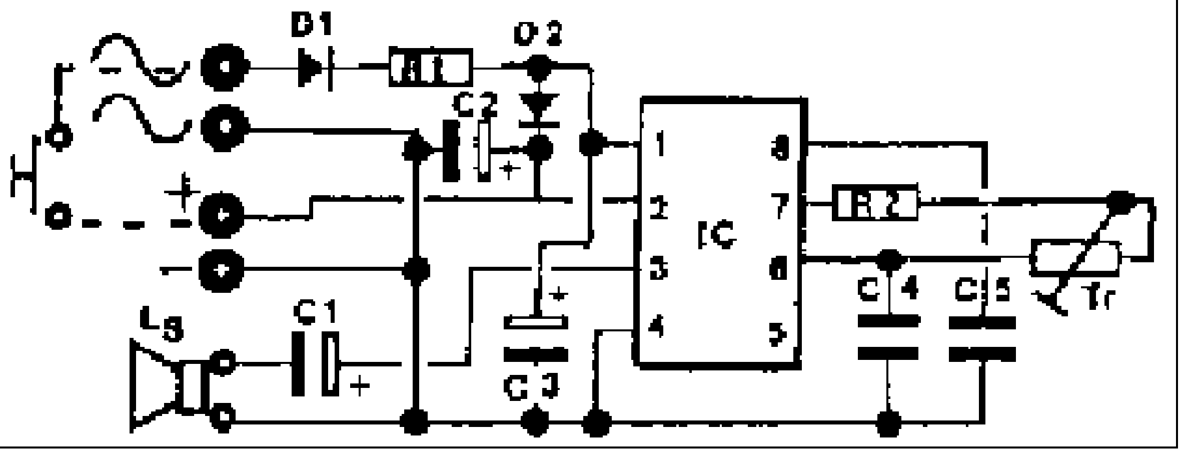
CIRCUIT DIAGRAM

2٧ - 3-Tone gong No.B164 دائرة جرس باب ثلاثة نغمات

الدائرة تصدر ثلاث نغمات مختلفة. جهد التشغيل للدائرة ٩ فولت وتعمل مع سماعات ٨ اوم وتستخدم لجرس الباب أو كإشارة تعريف أو للإعلان عن الإخبار . وتعمل باستخدام زرار ضاغط أو عن طريق الجهد الناتج من جرس الباب .

Melodious, electronic 3-tone Gong with the Siemens IC SAB 600. Ideal as door gong, identification signal, announcement of news etc. Operating voltage: 9 V. For loudspeaker 8 Ohm. Released through a pushbutton or with a voltage 6...12V coming from the doorbell system (DC or AC voltage). Please take special care when equipping the printed circuit board that the right polarity of the diodes and

elcas is used (these parts have to be placed in the right manner onto the printed circuit board according the components equipment print).The IC has at one side a slot, which has to coincide with the slot at the components equipment print. The printed circuit board is operated through a battery or a power supply 9 Volt. As loudspeaker it is advisable to use an ordinary 8 Ohm loudspeaker. But it has to be fitted into a case or baffle board. If the loudspeaker housing has been connected loose at the working bench, sound will be considerable inferior as with a fixed loudspeaker (the housing or the baffle board will do as resonance board). Through the trimmer desired sound can be adjusted. The gong may be either released through a pushbutton (working current) or in case of an existing doorbell system through a short voltage pulse on the connections "signal voltage" (6...12V). This signal voltage can be supplied by the doorbell. The operating voltage of 9V must nevertheless be connected!

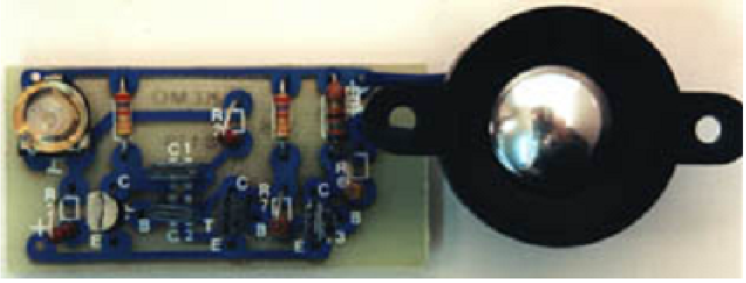


CIRCUIT DIAGRAM

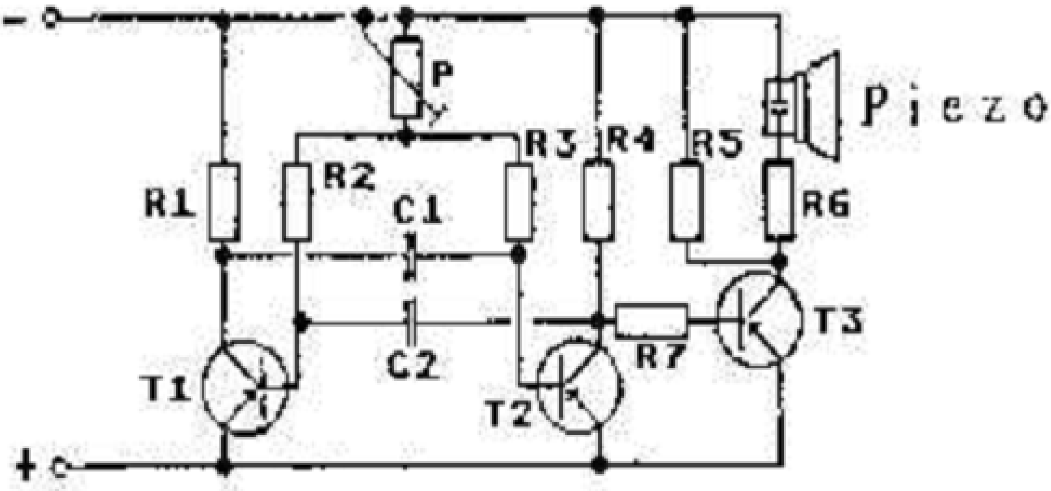
2٨- ULTRASONIC DOG WHISTLE No. B179 دائرة لتوليد ترددات مسموعة للكلاب

تقوم هذه الدائرة بإصدار ترددات فوق صوتية مسموعة جدا بالنسبة للكلاب وغير مسموعة للإنسان . وتنتج الدائرة ترددات قابلة للتعديل بين ٨٠٠٠ هيرتز و ٢٥٠٠٠ هيرتز ومع الدائرة سماعة خاصة بها . ويمكن استخدام الدائرة في تعليم الكلاب . جهد التشغيل للدائرة ٩ فولت.

This electronic ultrasonic whistle emits high-powered ultrasonic sounds which are widely audible for dogs. These high frequencies are mostly not to be heard for the human being, dogs can be drilled with it. The frequency is adjustable between approx. 8000...25000 Hz. A special piezo loudspeaker is included. Operating voltage: 9V. Indispensable for all dog-owner! The printed circuit board has to be equipped according to the parts list and the plan. As operating voltage a 9V battery will be sufficient. It will be expedient to use a small pushbutton, which switches on the battery but only as long as the pushbutton is pressed. The loudspeaker has to be mounted providing that the hemispherical special membrane of the piezo loudspeaker has been fitted with completely free propagation and without any covering. Sounds will emerge out of the metal colored membrane. Ultrasonic sounds have a considerable directional effect. Therefore, the loudspeaker should always be held to the dog, if you are going to call for it. Through the trimmer potentiometer on the printed circuit board, sound can be adjusted as desired. Likewise to human beings the hearing capacity of dogs in regard to higher sounds will decrease when getting older. We recommend for older dogs to use a lower sound than for a young dog.



layout top view

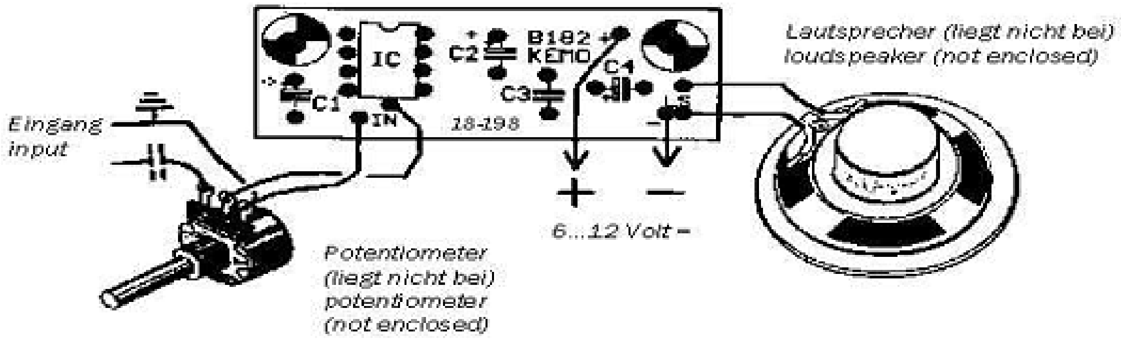


circuit diagram

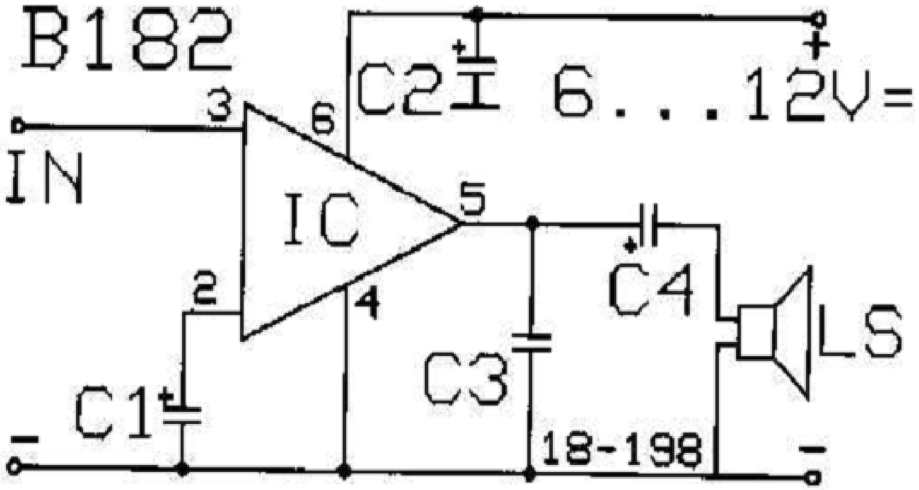
29 - Amplifier 1 Watt No. B182 دائرة تكبير قدرتها ١ وات

مكبر عام بقدرة ٢ وات . جهد التشغيل للدائرة من ٦ فولت إلى ١٢ فولت . حساسية الدخل ٥٠ ملي فولت . تعمل الدائرة مع السماعات ٨ اوم . النطاق الترددي من ٢٠ هيرتز إلى ٢٠٠٠٠ هيرتز.

Small universal amplifier with a peak sound capacity of 2 Watt. Operating voltage: 6...12 V=. Input sensitivity: approx. 50 mV, loudspeaker connection: 8 ohm. Frequency range: approx. 20...25000 Hz.
Please take special care, while carrying out equipping of the printed board, that the elcas have been fixed into the board correctly (attention! positive and negative). The IC has been marked at one side of the housing with a notch, which should coincide with the corresponding mark of the printed board. As volume control it is possible to use a potentiometer with a value between approx. 10 k and 100 k log. Whenever there will be connected signal sources without output coupling capacitor, it is necessary to connect a capacitor 0,1 µF in series with the input of the amplifier. The amplifier will show peak power at 12V= operating voltage. With lower voltages output power will decrease correspondingly. Please pay attention that the current supply will be sufficiently powerful. The amplifier has a current consumption of max. 200mA! Therefore, it is advisable to use either a small power supply or powerful batteries (e.g. 2 x 4,5V flat batteries connected in series). The small 9V block container batteries will become to easily run-down! The cables leading to the input of the amplifier, to the potentiometer and to the signal source should be as short as possible and also screened! The screening network of the screened cable will have to be connected with earth (negative pole).



Top View



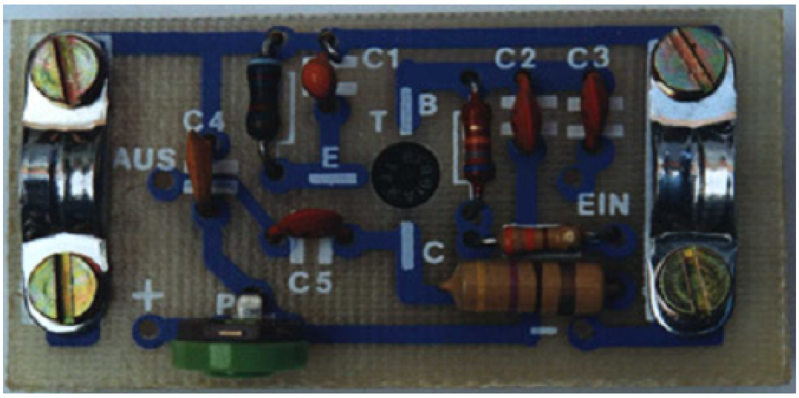
Circuit Diagram

٣٠- Antenna amplifier approx. 50...1000 MHz No. B199

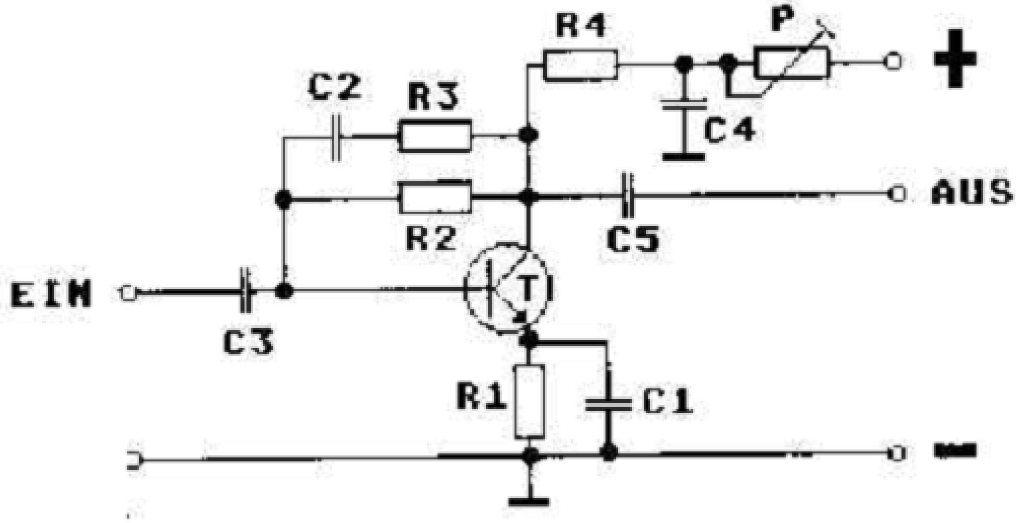
مكبر إرسال أحادي المرحلة بمعامل تكبير قابل للتعديل بشكل مستمر و أعلى معامل للتكبير هو ١٥ ديسيبل . ويعمل للقنوات التليفزيونية والإذاعية . مقاومة الدخل و الخرج من ٥٠ اوم إلى ٧٥ اوم . ويوجد مكان لتركيب الكبل المحوري على اللوحة المطبوعة لتوصيل إشارة الدخل . جهد التشغيل للدائرة من ٦ فولت إلي ١٨ فولت . ويجب أن يلحم الترانزيستور T1 على اللوحة المطبوعة في المكان المخصص له اسفل اللوحة المطبوعة.

Single-stage antenna amplifier, with continuously adjustable amplification up to max. 15 dB. For any television range from channel 2 up to channel 65, extraordinary suitable for VHF radio and cable television. Input and output impedance: 50...75 Ohm. There are prepared clamps for coaxial cable on the board. As required it is possible to connect two antenna amplifiers one after another. The total amplification will correspondingly increase. Operating voltage: 6...18V. The transistor T1 has to be soldered carefully with the connecting pins underneath the printed board on the conductor line, provided for this purpose. The drilling hole at the printed board will take the transistor body. The transistor should be soldered that way that the print on the transistor will be seen through the hole (from the wiring side). All other component parts should be soldered with as short as possible connecting wires on the printed board following the component print. Depending on each application (desired frequency range) there are different component parts for the components C3, C5 and R3. In case you

want to use the amplifier within the frequency range of VHF / cable television, please mount the printed board according to the parts list. In case you want to use the amplifier almost within the frequency range of the UHF channels, channel 21 up to channel 65, then it is necessary to use the mentioned parts, on the right, different values. These different values have been indicated separately at the right side of the parts list. All other component parts will remain without modification. In case the amplifier should be used at the same time as broadband-amplifier for any frequency, then it is advisable to use component parts for the frequency range UHF channel 21...65. It operate within the lower ranges up to VHF, but won't show within the lower ranges utmost power. The antenna amplifier has to be fixed into a metal total enclosure. The choke should be mounted directly at the antenna amplifier. As choke could be used a simple small ferrite core with approx. 10 turns enameled-insulated wire. The screws of these clamps have to achieve a good electric contact with the subjacent strip conductor. The antenna cable has to be insulated, the inner conductor has to be soldered each with the connections ON and OFF and, consequently the bare screening network fixed with screws under the clamps. Through the trimmer potentiometer at the board, it is feasible to adjust the power continuously. Therefore, it is possible to avoid any adjustment difficulties.



Layout And Top View



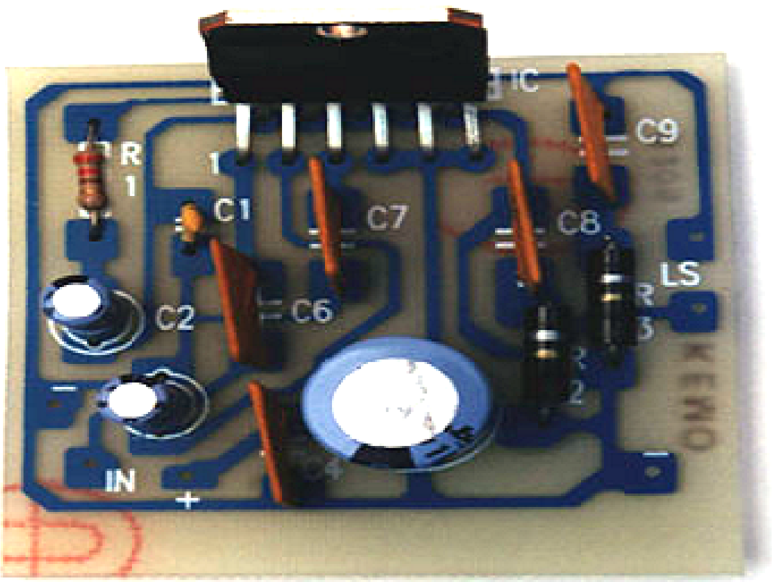
CIRCUIT DIAGRAM

31 - Amplifier 50 Watt No. B205 دائرة تكبير ٥٠ وات

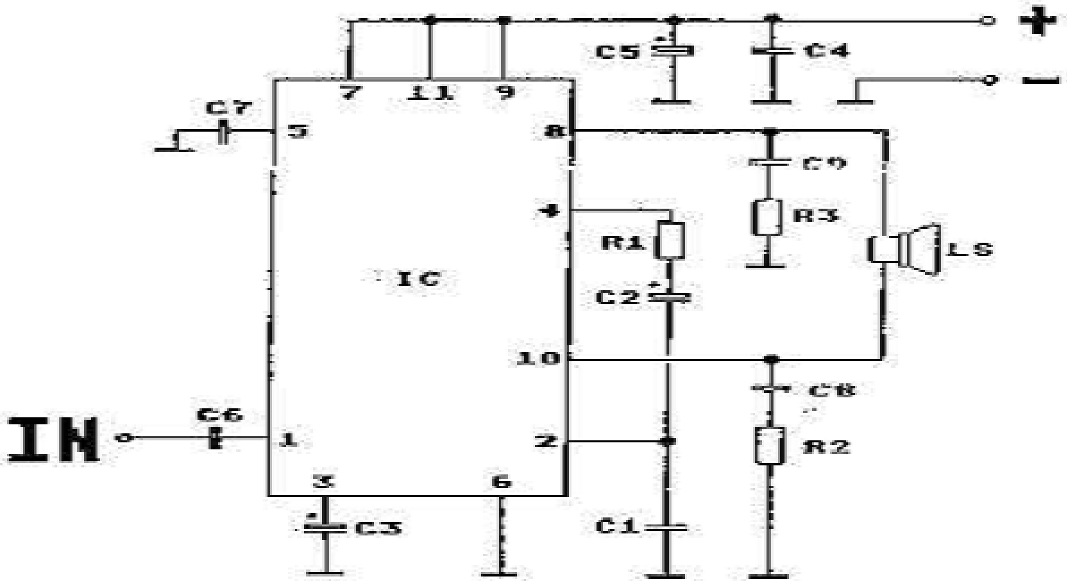
مكبر هاي فاي عالي الجودة بقدرة ٥٠ وات . جهد التشغيل للدائرة من ٦ فولت الى ١٨ فولت و أعلى تيار دخل ٣ أمبير وتعمل مع السماعات من ٤ اوم إلى ٨ اوم والنطاق الترددي للدائرة من ٢٠ هيرتز إلى ٣٠ كيلو هيرتز .

High-quality Hi-Fi amplifier including bridge circuit with IC. Power: 50W music, 30W sine. Operating voltage: 6...18 Volt. Current supply: max. 3A. For loudspeaker 4...8 Ohm. Sensibility: approx. 300mV. F: approx. 20...30.000 Hz. Required cooling element: approx. 10x4x2 cm (cooling fin). Please take special care while mounting the printed wiring board: The elcas have to be placed observing especially "+" and "-". The connections of the IC's have to be bent carefully with the aid of a flat nosed pliers onto the basic grid of the printed wiring board. The IC must be fixed at a cooling element (approx. 10x4x2 cm, not enclosed in the kit). The cooling element should be mounted insulated because of being connected electrically with the IC. That means, don't connect the cooling element directly with the housing etc.! It is possible to connect at this amplifier signal sources which show approx. 300mV output voltage (crystal record player, cassette deck, etc.). With a preamplifier (e.g. B073) it will be feasible to increase the sensibility up to approx. 1mV. In case you want to operate at this amplifier magnetic record players, it is necessary to connect an equalizing preamplifier (e.g. B074). For stereo operation it is necessary to connect 2 amplifiers, for each channel one amplifier. The amplifier produces with a 4 ohm loudspeaker approx. 50W and with a 8 ohm loudspeaker approx. 32W. The power supply must be well filtered (filter elcas approx. 4700µF) and, if possible, have a stabilized output voltage.

In case the current supply shows to be far too ohmic, the amplifier may oscillate or distort. Then, it is necessary to connect parallel to the voltage supply at the printed wiring board an elca with 1000µF 40V (between + and -).



LAYOUT AND TOP VIEW



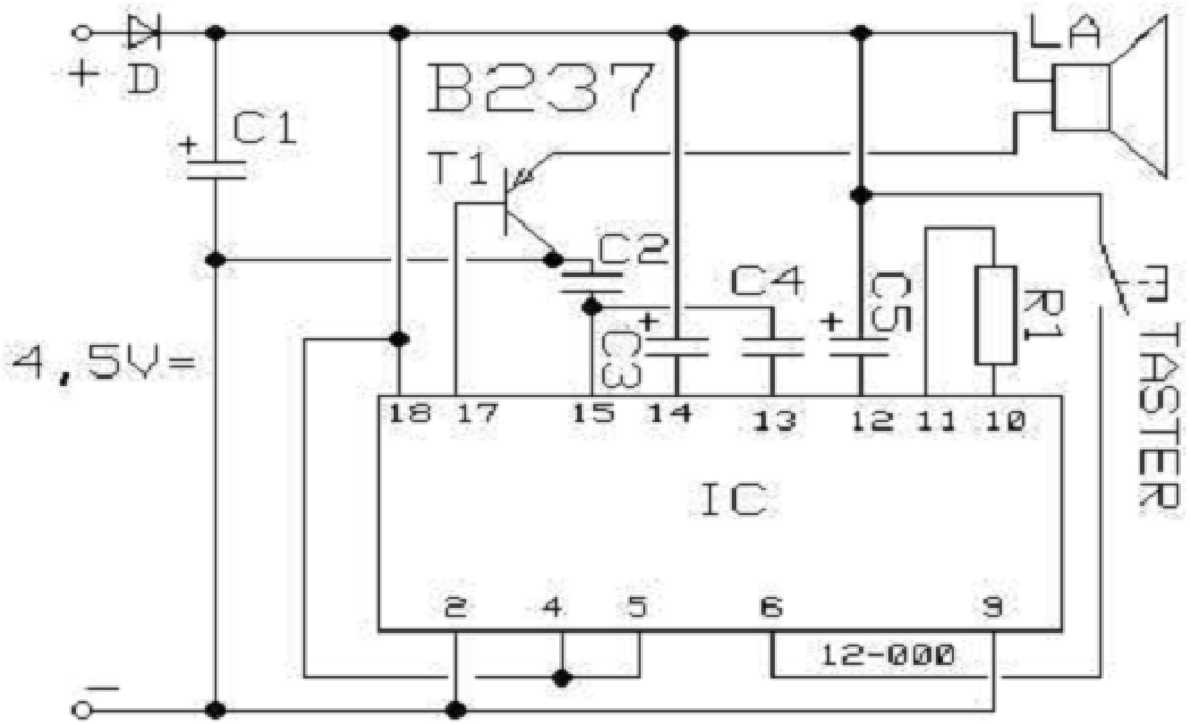
CIRCUIT DIAGRAM

32- 6-Melody Generator No. B237 دائرة توليد نغمات

في كل مرة يتم فيها الضغط على المفتاح يقوم مولد النغمات بتشغيل واحدة من أثنى عشر نغمة مخزنة بداخلة وتستمر تعمل من ١٥ إلى ٢٠ ثانية . جهد التشغيل للدائرة من ٣ إلى ٤,٥ فولت ، تستخدم سماعات من ٤ إلى ٨ اوم .

Every time after pressing the key, the melody generator plays one of the 12 stored melodies in succession. The melodies always play for about 15...25 seconds.

Operating voltage: 3...4.5V=. Required loudspeaker: 4...8 ohm. Use: doorbell, break signal, etc The board has to be assembled and soldered according to the parts list and assembly print. Please pay attention to the correct polarity of the electrolytic capacitors, the diode and correct installation of the IC (one side of the case has a notch). If possible, please use a 4.5 volt battery as operating voltage. When using a power supply, it must be absolutely a "stabilized" power supply! (Please check the tension.) Simple non-stabilized power supplies do often have a much higher output voltage at a low current load than indicated on the monitoring switch of the power supply. A voltage of more than 5V, however, will destroy the IC!! Please use a 4- or 8-ohm loudspeaker with rigidly suspended membrane (loudspeakers with soft rubber beading membranes are too low for this purpose). You may use any type between 0.25...5 watt. Of course, the loudspeaker has to be installed into a case in order to provide its full sound. One push-button 1 x ON can be connected to both ”Key Button”-connections (not enclosed). When short-circuiting both contacts with the push-button, a melody starts and then stops automatically. When pressing the push-button again, the next melody starts etc. In case long cables shall be laid, you may extend the cable towards the loudspeaker up to max. 50 m and the cable towards the current supply may have a maximum length of 50 m, too. The cable towards the push-button, however, must only be 10 cm long at maximum! The reason for this is that the input of the IC at the push-button is highly resistive and electric disturbances from the outside (e.g. from running electric motors, lamps, etc.) may cause that the melody generator releases permanently and uncontrollably.



CIRCUIT DIAGRAM

Other circuits

1- 2 Watt Audio Amplifier دائرة تكبير ٢ وات

تعمل هذه الدائرة مع نطاق واسع من الترددات و تعطي مستوى أقل من التشويش ونستطيع أن نستخدم معها سماعات ٨ اوم بقدرة حتى ٥ وات مع تشويش أعلى نسبيا ونستطيع استخدام أي مصدر جهد من ١٢ إلى ١٨ فولت .

Notes:

This was one of the earliest circuits that I ever designed and built, in Spring 1982. At that time I had only an analogue meter and a calculator to work with. Although far from perfect, this amplifier does have a wide frequency response, low distortion, and is capable of driving an 8 ohm speaker to output levels of around 5 watts with slightly higher distortion. Any power supply in the range 12 to 18 Volts DC may be used.